NAVY CIVIL ENGINEER

SEABEE

OPERATIONS

PUBLIC

WORKS

CIVIL ENGINEER CORPS
UNITED STATES NAVY

STAFF

& SPECIAL

CONSTRUCTION

CONTRACTS

INTRODUCING
TECHNICAL NOTES
FOR
PUBLIC WORKS
PAGES 23-26

ON THE COVER

The four 'faces' of the Navy's Civil Engineer Corps — Seabee Operations, Public Works Management, Contract Negotiations and Staff and Special duties — indicate the well rounded career of today's CEC officer. The career growth of today's officer, particularly junior officers entering the Corps, is the subject of the article "The Corps — A Status Report" beginning on page 4. The 'faces' are further identified on page 43.

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NOBODY WANTS TO FIGHT but somebody has to know how! Interesting premise? See what author Richard Cowan has to say about that on page 27.

THIS IS EFFLORESCENCE. What to do about this structural psoriasis is found on page 26 in our new feature Public Works Technical Notes.

A TOWERING INFERNO could happen to Navy properties if proper smoke and heat control is not considered. See page 18 for details.

Navy Civil Engineer Corps

The Corps: a status report

By CDR JAMES W. WEIR, JR., CEC, USN
CEC Detail Office
Bureau of Personnel

• Alexandria, Va.

In this era of reductions and base closures within the Department of Defense, and with the multitude of study projects going on in Washington which could result in far reaching change for the military man, there is cause for the officer aspiring to a career in the Civil Engineer Corps to ask:

- What is my future as a Navy Civil Engineer?
- What policies are guiding my career?
- What is the status of the Civil Engineer Corps?

Getting answers to such questions is not easy, especially if one is far from the Washington scene.

WHAT IS OUR FUTURE?

First of all the Civil Engineer Corps is a corps of specialists, possessing the technical competence necessary to plan, design, build, and maintain the navy shore establishment. The corps, an off-spring of the Bureau of Yards and Docks, one of the original bureaus of the Navy, owes its existence to some forward thinkers in the "old Navy" who realized that *specialists* are required to do *specialist's* jobs.

Neither technological nor organizational change will eliminate the need for the Civil Engineer Corps. The extent of the Navy's investment in its shore establishment insures this. To retain the engineering competence and management ability required to maintain this establishment, and plan for its future responsiveness to the fleet's needs, the Navy will continue to need the type of officer found only in our corps.

Thus our fundamental tasks — planning, designing, construction, maintaining, and even disposing of the various segments of the shore establishment — guarantees our future. We can, however, expect the corps to be reduced in size and to continue to have shortages of officers for the next several years.

CORPS STRENGTH

One of the most challenging problems facing today's Navy is how to accomplish its growing and changing missions in light of continuing force reductions. Now that the Southeast Asia conflict has ended there is tremendous pressure from Congress to reduce the military to a peacetime level. This in fact is now being accomplished and the CEC is taking its share of strength cuts along with the rest of the Navy. (Figure One illustrates this point.)

It is anticipated that authorized billets for the CEC will drop down to about 1417 by FY77 and level off at something under 1400 by FY81. This is considerably below the 1766 billets justified by the CEC Zero Base Study, but is dictated by the plan to reduce the officer structure to 63,000 by the end of FY77 while moving toward an unrestricted line fraction of 59% by 1981. Obviously some of the billets which the CEC feels are valid requirements must be eliminated.

For the first time in several years the Civil Engineer Corps is experiencing a serious shortage in on-board officers. As of 1 October 1974, our on-board strength was 1418 officers, or 40 below our allowance. (Figure Two shows that for the past six years our on-board strength

has been equal to or greater than our billet requirements.) We no longer enjoy this luxury and current projections indicate that this strength deficiency will continue at least into FY76.

One of the causes of this situation has been the inability to fill all of our input quotas, particularly for Officer Candidate School (OCS). In FY74, our total CEC input was 77 versus a quota of 92. Present projections indicate that FY75 input will be approximately 132 officers against a quota of 166. This, coupled with increased losses due to retirements, resignations and releases from active duty,

"One of the most challenging problems facing today's Navy is how to accomplish growing and changing missions in light of continuing force reductions."

results in an insufficient number of officers to provide contact reliefs in all billets. Some billets must go unfilled, or will be filled with officers lacking the desired seniority or experience. The challenge for all of us is to achieve optimum utilization from our reduced resources.

CAREER PATTERNS

The Chief of Naval Personnel (BUPERS) is responsible for personnel planning and assignment of all naval officers. BUPERS implements the policies and requirements as set forth by the Department of Defense, Secretary of the Navy, and Chief of Naval Operations concerning personnel.

However, from the CEC officers' point of view, the Chief of Civil Engineers plays a most important role in his (Article 0809 Navy Regulations) responsibility as Principal Advisor and Sponsor for CEC officers. Only careful consideration of training and duty patterns can assure that the Corps will have sufficient officers well qualified in later years to fill key positions and provide leadership.

CORPS STRENGTH

FY	CEC END STRENGTH	NAVY OFFICER STRENGTH	PERCENT
1965	1721	77,866	2.21
1966	1810	79,580	2.27
1967	2037	81,677	2.49
1968	2186	85,200	2.56
1969	2144	84,974	2.52
1970	2012	80,536	2.49
1971	1824	74,557	2.44
1972	1735	72,929	2.37
1973	1603	70,340	2.27
1974	1460	67,600	2.16

Our CEC billets are in four specific areas:

- Maintenance of existing shore facilities (Public Works)
- Naval Construction Force Operations (Seabees)
- Construction of new facilities by contract (OICC/ROICC)
- Staff/other

There is a wide spectrum of billets within these groups, some of which overlap into other categories. The desire of the Chief of Civil Engineers is to have an officer assigned to at least one billet in each of the four categories by the time he is eligible for promotion to rank of commander. Usually this time period will be 15 years (ensign-2 years, lieutenant (JG)-2 years, lieutenant-5 years, lieutenant commander-6 years). From these 15 years, one can subtract 18 to 24 months for schooling (CECOS, PG school, service schools, etc.), but this still leaves enough time for the four types of career billets.

Above the rank of lieutenant commander, career pattern is one of service where needed — the best man for the job. This doesn't mean that a senior officer becomes specialized in one of the categories of the career pattern. He is still moved from job to job, but without training pattern as a prime consideration.

While the preceding discussion covers the typical career pattern, an officer's career is, to a large extent, up to him. As a naval officer he must learn all he can about the naval service; he must become a better and more experienced engineer, manager and administrator; he must strive to build for himself a record of quality that will enable him to be advanced through our highly selective promotion system.

DETAILING CONSTRAINTS

The detailers assist in formulating career patterns by assigning officers, ensign through lieutenant commander, to as many of our four basic types of duty possible. In doing so, however, problems invariably arise due to factors which from time to time serve as constraints to detailing. These include: availability of billets of various types; geographical distribution of billets; prescribed tour lengths for duty, particularly overseas billets; assignment policies for junior officers with reserve duty obligations; new requirements imposed by changing conditions and availability of PCS funds.

Our CEC billet distribution by function is shown in Figure Three. This breakdown is clear with the exception of the catch-all category of "staff/other." "Staff/other" includes billets which do not readily fall into one of the other categories and include: engineering field divisions; major staffs; bureaus; research; ocean engineering; nuclear programs; instructor; students; reserve programs; foreign governments (MAAG, etc.); certain headquarters billets; and construction battalion center billets. Since billets for the four types of duty are not equal, it is obviously not possible to assign every officer duty in all the other categories.

The following breakdown shows the geographical distribution of billets:

CEC GEOGRAPHICAL DISTRIBUTION

Continental United States	65%
East Coast	40 (13 in DC)
West Coast	19
Other	6
Overseas	20%
Asia and Pacific	13
Europe and Atlantic	7
Seabees	15%

"The desire . . . is to have an officer assigned to at least one billet in each of the four categories before he is eligible for promotion to Commander."

Over one-third of our billets (including Seabees) are overseas. However, rank requirements of overseas billets are not in proportion to the actual rank structure of the Corps, and since many of our officers have too many dependents to go overseas, the chances for an overseas tour varies between ranks. Everyone may want a tour in Europe, but with only seven percent of our billets there, it is impossible to satisfy everyone's desires.

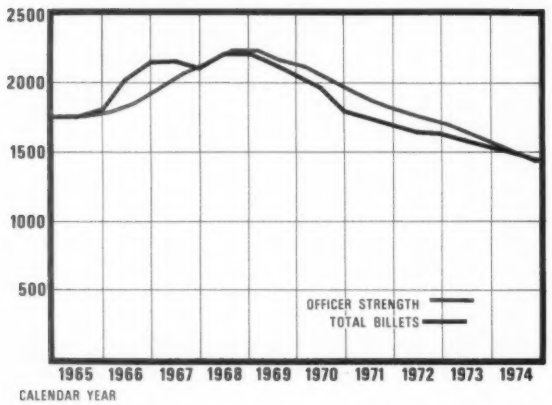
The length of overseas tours is prescribed by the Secretary of Defense and spelled out in BUPERS instructions. Stateside tour lengths are controlled by BUPERS policy. Because accompanied overseas tours are relatively longer than "normal" stateside tours, inflexibility develops. The current Navy policy prohibits assigning officers with more than four dependents (wife and three children) overseas.

...a status report

This includes Hawaii and Alaska. Three percent of our lieutenants and 12% of our lieutenant commanders fall into this restrictive classification!

The assignment policy for junior reserve officers is governed by the need to conserve travel funds and to increase the productive utilization of junior officers. The policy is to assign USNR officers who have three year active duty obligations to one duty station for their entire obligated service. Officers with longer periods of obligation are usually rotated every two years. Junior officers serving three years will be rotated on request after two

OFFICER STRENGTH Vs BILLET REQUIREMENTS



years if they are available and agree to extend for a second tour. If the second assignment is overseas, they must extend for the prescribed tour for the particular location.

New requirements continue to arise due to technological advances and changes in the world situation which require us to provide officers in new areas while maintaining forces in areas where we are already established. An example of this is forward deployment in the Mediterranean.

Another generator of new requirements is the current reduction in size of the armed forces with the associated base closure actions. These create requirements for new staff billets and reduce the number of operating billets available. It is also noteworthy that there is a shortage of personnel of proper rank to fill requirements (see Figure Four). As a result of these actions major organizations are finding themselves with fewer billets and with officers occupying billets normally occupied by higher ranking officers.

DETAILER PRACTICE

In actual practice, the initial assignment of an officer upon his graduation from Naval School, Civil Engineer Corps officers (CECOS) is a relatively simple task; there are so many ensigns available and so many requirements to be filled. The students are interviewed and asked to state their preference for type of duty and geographical location. The requirements, the student's qualifications, and his personal desires are then integrated into an individual assignment for each graduate.

Detailing thereafter gets more complicated. The detailer must first consider the needs of the service and then the needs of the individual. In doing this, he is guided by the officer's preferences, Bureau of Naval Personnel policies, the preferred career pattern, billets requiring assignment, the available individuals, and the availability of permanent change of station (PCS) funds.

All of these factors are taken into consideration and

"Everyone may want a tour in Europe, but with only seven percent of our billets there, it is impossible to satisfy everyone's desires."

then a master plan is prepared which includes a complete detail sequence on every officer projected to rotate within the next twelve months. These sequences are approved but the information can be released only four-to-six months in advance of the move. The reason is that due to new billet requirements, personal problems, etc., about 20% of the master plan is continually being revised. Release of this information prematurely would cause too many false starts by individual officers.

The detail office moves about 650 officers every year. Each officer being reassigned is part of a detail chain involving an average of six moves. Allowing thirty days leave, travel and preceed time, and ten days turnover, a chain must begin in September to get the last name in the chain to his duty station by the following June. We are just unable to move everyone during summer vacation or at school mid-term.

In the actual determination of assignments at least two people in the detailing chain must concur in the proposed change of duty. The junior officer detailers propose a move or a series of moves and upon review and approval by the senior CEC detailer, action is taken to issue the necessary orders. When the junior officer detailers present a proposed move (referred to as a slate) he also presents for review the officer's fitness report jacket and the latest preference card.

Frequently, there is first a discussion regarding the billet and the requirements for the job. The fitness report record and the preference card are reviewed to ascertain the qualifications of the individual and the potential suitability of the detail.

In the case of assignment of senior officers, the initial assignment planning is done by the senior CEC detailer and presented to the Assistant Chief of Civil Engineers in NAVFAC Headquarters for his review. Upon his approval in the case of assignment of commanders, orders are issued.

All "slates" on captains are further presented to the Deputy Chief and Chief of of Civil Engineers for their approval. In addition, all officers ordered into NAVFAC Headquarters and certain other key billets are cleared with the Chief of Civil Engineers.

PROMOTIONAL OPPORTUNITIES

All of us look to the future. Of particular importance to the officer is promotion: What promotion opportunities exist? and when? The following table indicates the intervals for promotion in the various ranks at the present time:

Rank To Which Promoted	Total Years Commissioned Service
Lieutenant (Junior Grade)	2
Lieutenant	4
Lieutenant Commander	9
Commander	15-16
Captain	21

...a status report

This table tells only half the story. Eligibility is one thing; opportunity is another. The number of officers who will be promoted each year to each rank is based upon the needs of the service. For a number of years the Corps has been able to justify higher promotion opportunity percentages within the approved zone than the unrestricted line.

A look at the percentage opportunity used during FY75 shows:

	CEC % Opportunity	URL % Opportunity
To CAPT	65%	60%
To CDR	70%	70%
To LCDR	85%	75%
To LT	95%	95%
To LTJG	All Qualified	All Qualified

These percentages, when applied to the number of officers in the promotion zone, result in a specific number of promotions that the promotion board may recommend. Fifteen percent of these promotions may come from below the normal promotion zone.

Of perhaps greater interest is the outlook for promotion in the future. It is expected that by FY77 the promotion flow point for captain will be 21-22 years and the flow point for lieutenant commander should be 9-10 years. The flow points for other ranks should remain essentially unchanged. To project promotion percentage opportunity requires a look at the current corps rank composition.

Looking at the chart on page eight, it can be seen we are below allowance in all ranks except commander, lieutenant junior-grade, and warrant officers. We expect these shortages to continue and, therefore, promotion opportunity should remain slightly higher than the unrestricted line for the next several years.

"... major organizations are finding themselves with fewer billets and with officers occupying billets normally occupied by higher ranking officers."

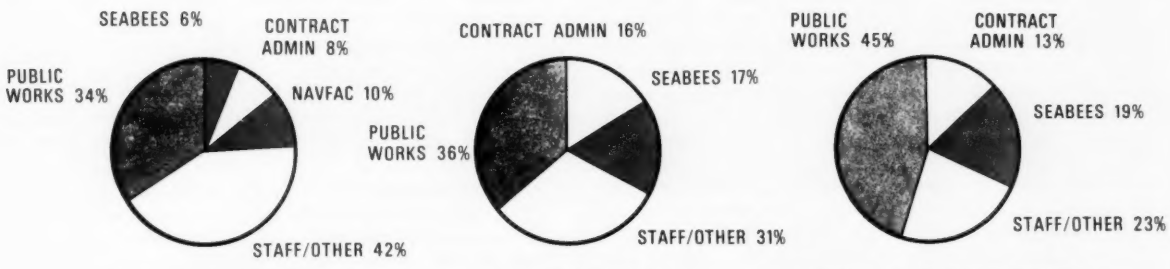
INPUT

Another interesting subject for the Corps is where our input comes from. During the last three years (including expected FY75 input) the percent input by sources has been as follows:

OCS	42%
NROTC, Regular	21%
NROTC, Contract	5%
USNA	5%
Line Transfer	19%
Direct Appointment/ROC/Other	8%

It is obvious that the largest share of our input comes from OCS. In addition, any increase in total input must be almost exclusively OCS because the other input sources are relatively fixed. We expect to require a total annual input of about 170 officers, most of whom will be reserve

CEC BILLET DISTRIBUTION BY FUNCTION



CAPTAIN/COMMANDER

LIEUTENANT/ LIEUTENANT COMMANDER

LIEUTENANT JUNIOR GRADE /ENSIGN/WARRANT OFFICER

...a status report

officers. Therefore the corps must depend on augmentation for a large percentage of our regular officers.

AUGMENTATION

Title 10, USC limits the CEC by law to 3% of the unrestricted line (URL) regular officer strength which equates to 1050 regular officers. During the Vietnam conflict, the Navy was able to obtain from Congress a suspension of this law on an annual basis. As a result, the CEC was not restricted in its number of augmentations and the regular officer strength quickly rose well above the 1050 ceiling.

The proportion of CEC officers with advanced degrees has continued to increase until over 54 percent of all 510X officers are now in this category."

Then, as policies tightened, severe restrictions were imposed to the point that the CEC received only token quotas for most augmentation boards. Some boards, in fact, had no quotas. Those reserve officers who were among the few to have been selected last year were placed in a special category for augmentation at a future date as vacancies occurred within the CEC regular officer ceiling of 1050. All the selectees in that special category have now "made their number" and our CEC regular numbers are within the 3% limitation.

What can we expect in the way of augmentation opportunities in the future? Assuming that we start each fiscal year at 1050 regular officers, the following statistics will indicate approximately how many augmentations will be permitted during an average fiscal year:

Regular officer losses (retirements & resignations)	75 avg/yr
Regular officer gains (NROTC, USNA, Line Transfers)	50 avg/yr
Allowable Augmentations	25 avg/yr

Although the CEC will not have unlimited augmentations as it has in the past, 25 per year will provide an opportunity for our outstanding reserve officers to get selected for augmentation into the regular Navy.

EDUCATIONAL OPPORTUNITIES

The Navy postgraduate school program continues to be one of the most popular programs available to CEC officers. The primary purpose of the program is to provide qualified officers to fill billets requiring advanced education, however, the program also provides excellent opportunities for officers to satisfy their personal desires for graduate degrees. A recent review of all CEC billets was made in order to identify what billets require officers with certain specialized education. These billets have been P-Coded. The number of billets and mix of specialty codes is the basis for forming and justifying the annual postgraduate program input. The follow-up to identifying billets and educating officers is, of course, to assign officers with the appropriate specialized education to the proper P-Coded billet.

Although postgraduate school quotas have been reduced for fiscal year 1975, the impact on CEC officers has lessened by reductions in Corps strength. From the figures shown below, one can see that selection opportunity remains high:

FY 1976 PG Quota Plan

Technical	30
Management	14
SUB-TOTAL	44
USNA Ensigns	6
Line-to-Staff transfers	10
TOTAL	60

The proportion of CEC officers with advanced degrees has continued to increase until over 54% of all 510X officers are now in this category (including those presently enrolled in graduate schools). We expect our career officers to continue to have an excellent chance of obtaining a masters degree. The PhD program is expected to continue at an input rate of about one officer per year. Details regarding the PG program and application procedures are published annually in a NAVFAC notice issued each January.

A second important education program available to CEC officers involves the service colleges, specifically the National War College, the Naval War College, the Industrial College of the Armed Forces and the Armed Forces Staff College. Annual quotas for these institutions are given below:

National War College	1 (every 3 yrs)
Naval War College	
Warfare (Senior)	1
Command & Staff (Junior)	1
Industrial College of the Armed Forces	1
Armed Forces Staff College	4

31 DEC 1974 BILLETS Vs ON-BOARD

	BILLETS	ON-BOARD	SHORTAGE
FLAG	8	6	2
CAPT	95	83	12
CDR	199	202	3 OVER
LCDR	362	338	24
LT	351	323	28
LTJG	240	276	36 OVER
ENS	210	138	72
WO	28	39	11 OVER
TOTAL	**1493**	**1405**	**88**

Selections for service colleges are determined by BUPERS board action and are based on availability and career potential. Since all eligible officers are automatically screened by the board, no applications are necessary. However, those officers who do *not* desire consideration for service college selection should so advise the Detail Office.

In this world of rapidly changing technology, the PG and service college programs will continue to be vital parts of CEC career patterns and will continue to offer unrivaled opportunities to CEC officers for personal development.

We can be assured that the Corps will continue to serve the Navy of the future. We will continue to be faced with billet cuts and manning shortages but we should remember that the rest of the Navy is experiencing the same problems. There is no easy solution, but if we, individually, continue to provide high caliber professional services, then we have no cause to worry about the future of the Corps.

Postgraduate School

One Path to the Top for Top CEC Officers

By LT GUY F. EVERHART, CEC, USN
NAVFAC Contracts, Bethesda
NAVFAC

• Alexandria, Va.

One of the most popular personnel programs available to Civil Engineer Corps officers is the Naval Postgraduate School program. The purpose of the program is to develop the technical and management expertise necessary to meet specific billet requirements (billets requiring advanced degrees are identified by Navy subspecialty codes).

As one might expect, roughly two-thirds of CEC PG School quotas are for technical curricula, with the remaining one-third for management curricula.

Technical curricula for which CEC officers are eligible include civil engineering (#470), electrical engineering (#471), mechanical engineering (#473), nuclear power engineering (#572) and petroleum engineering (#630).

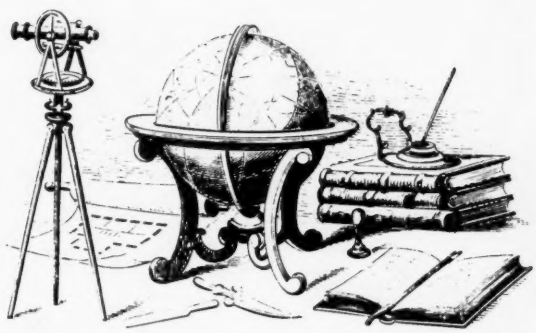
The civil engineering curriculum is subdivided into twelve options: ocean engineering, urban planning, structures/structural dynamics, engineering design and economic evaluation, sanitary engineering, public works administration, environmental/pollution control, transportation, soils/soils foundations, utilities management, hydraulics, and construction management.

Not surprisingly, 54% of the CEC officers recently selected for curriculum #470 have listed construction management or public works administration as first choices. All of these curricula are offered at various civilian universities throughout the U. S. With the exceptions of petroleum engineering and nuclear power engineering ,the postgraduate selectee may choose from a wide variety of universities. The nuclear power engineering and petroleum engineering curricula are offered at specified schools only.

For example, nuclear power engineering students attend Pennsylvania State University, petroleum engineering students attend the University of Texas and operations research students attend the Naval Postgraduate School at Monterey.

Certain schools such as the University of California, University of Colorado, Georgia Tech, University of Illinois, Massachusetts Institute of Technology, University of Michigan, University of Pittsburgh, Purdue University and Rensselaer Polytechnic Institute have traditionally received large numbers of CEC officers into their graduate programs.

However, as schools improve existing programs or develop new ones, the list of schools attended by CEC officers changes accordingly. For example, the engineering management department at the University of Missouri-Rolla will initiate a public works management curriculum beginning in September 1974. Construction management programs at Pennsylvania State University and the University of Florida received their first CEC graduate students in 1974.



Since it would be virtually impossible for him to stay abreast of all or even most of the excellent graduate programs available, the CEC Education and Training Officer (NAVFAC 09M11) must rely heavily on student feedback and university brochures for information. Persons who know of technical programs that they feel are of value to the Civil Engineer Corps are encouraged to submit such information for further investigation.

With one exception, all management curricula available to CEC officers are offered only at the Naval Postgraduate School, Monterey. At NPGS, CEC officers enroll in Navy management (curriculum #817) or computer systems management (#367).

In addition, the Civil Engineer Corps receives one quota each year for the financial management curriculum (#812) at George Washington University. Regardless of location, management students take courses in statistics, operations research, financial management, behavioral science and economics.

During the past ten years, an average of 55 CEC officers have been ordered to PG school each year. Because of increasing Congressional pressure to reduce graduate education expenditures throughout the Navy, the Civil Engineer Corps can anticipate future graduate school input levels somewhat below the level of recent years.

For FY 1975, the CEC input will be 48 officers. However, with the reduced size of the Civil Engineer Corps, the opportunities for career oriented CEC officers to attend Navy-funded graduate programs will remain excellent.

Fred Lehnhardt (left) and Arlyn Jackson examine the device developed by Dr. Adrian Richards to sample ocean bottom sediments at depths of 15,000 feet.

Sampling the depths

• Port Hueneme, Calif.

Before the Navy can embed deep-water anchors reliably into the seafloor, it first must determine the physical properties of the sediments that make up the ocean bottom itself.

Along these lines of research and development, the Civil Engineering Laboratory (CEL), Naval Construction Battalion Center, has completed a most comprehensive set of engineering tests of deep sea soils.

A four-week series of probes conducted to depths of 18,000 feet provided data on soil properties that should prove instrumental in predicting accurately the holding powers of explosive embedment anchors.

Homa J. Lee, a research civil engineer at CEL in charge of the project, said, "We believe that within three years the Navy will be able to predict an anchor's holding capacity within 20 percent of its actual capability."

The laboratory, after solving geotechnical problems, intends to develop its anchor engineering technology to the point where it can extract core samples of any seafloor and confidently forecast mooring potential, perhaps for a decade or more.

One of the most impressive aspects of the at-sea tests was their completeness. The tests were total experiments including in-place strength measurements, core samples, and laboratory strength measurements to be incorporated into future CEL anchor tests. The Laboratory already has developed deep ocean explosive embedment anchors with holding capacities as high as 48,000 pounds.

Lee said the tests were conducted in coastal waters off Grand Bahama Island and north and south of Puerto Rico. Why these sites?

"The seafloors in these areas contain typical sediments such as ooze and deep ocean clay," the engineer explained.

CEL took three piston core samples and three box core samples. The piston samplers are 20 feet long, two-and-one-half inches in diameter, and weigh approximately a ton each. But Lee said these samples are relatively disturbed, thus the necessity for the more reliable box core.

It weighs about 150 pounds, is two feet by one foot by seven feet and provides high quality samples of sediments immediately beneath the seafloor.

Operating off the *USNS Lynch*, a naval oceanographic research vessel, CEL also accomplished five successful penetrations with a vane shear probe developed by Dr. Adrian A. Richards, a marine geotechnologist at Lehigh University.

The vane probe (a pair of perpendicular plates as large as eight inches in length and four inches in width) is inserted to a maximum depth of ten feet below the seafloor by a support tripod.

The vane shear device successfully measured the strength of the sediments in their natural undisturbed condition, Lee said.

An added bonus from the vane shear operations was the unexpected staying capability of the device's support tripod tower which is placed on the ocean bottom. In previous similar operations, it had been the general format of the ship to drift and pay out tethering lines connected to the tripod.

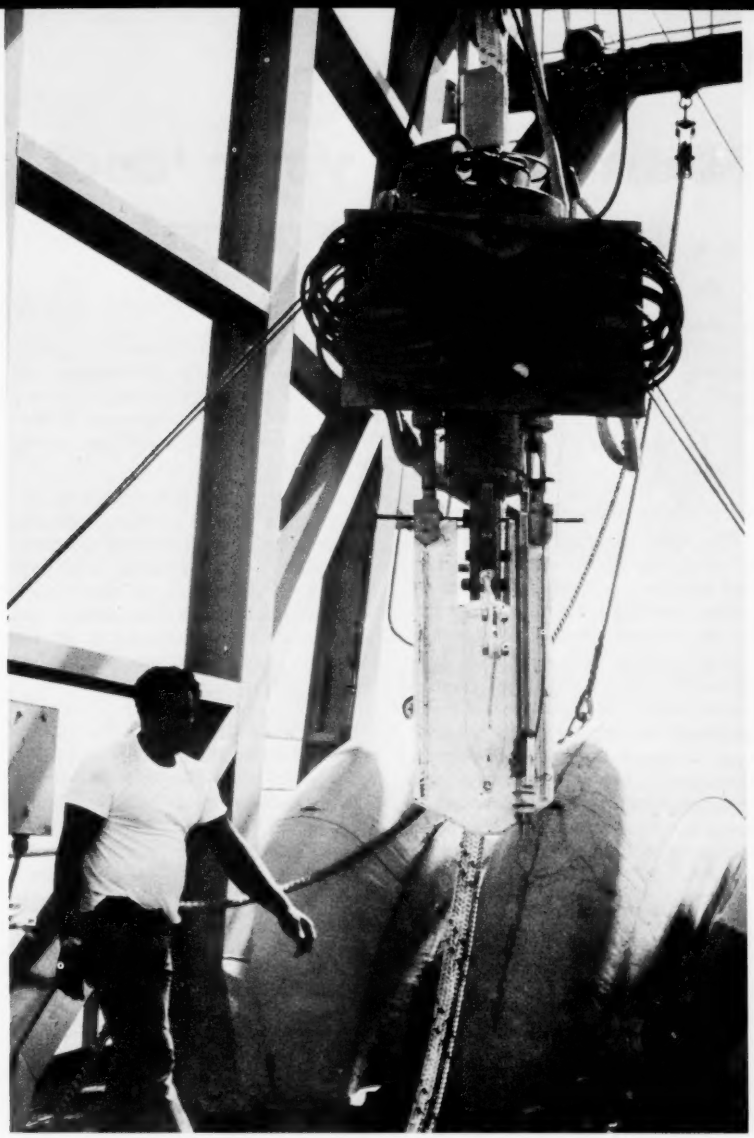
But this procedure frequently resulted in toppling the tower.

For the most recent operations, the captain of the vessel moored the ship in 6,000 feet of water. "And all five vane shear tests were completed without incident," Lee said.

The tests at sea are part of a large and varied seafloor anchorage project under way at CEL. Early this year, the laboratory will resume deep sea tests with its deep water anchor. The propellant-actuated device will fire approximately 12 flukes into the same seafloor sites examined earlier by Lee and his associates.

Based on data compiled during the Grand Bahama-Puerto Rico tests, CEL will predict the anchor's holding capacity in various ocean bottom soils.

...and getting a firm grip on the sea floor



The 1,800-pound deep water anchor which held 48,000 pounds at 12,000 feet. The anchor was developed by the Navy's Civil Engineering Laboratory.

• Port Hueneme, Calif.

In the latest of a series of tests, the deep water anchor, developed by the Civil Engineering Laboratory (CEL), Naval Construction Battalion Center, Port Hueneme, Calif., has been tested successfully three times at depths between 8,000 and 12,200 feet.

At maximum depth, the propellant-actuated anchor held 48,000 pounds, more than twice its design capacity.

The deep water anchor outperformed a conventional anchor four times as heavy which needed several thousand pounds of chain and line. The CEL anchor does not need connective gear or long mooring lines.

Robert J. Taylor, CEL project engineer, said although the anchor is functional, additional relability data are required. The anchor has undergone sea trials at depths between 18,000 and 20,099 feet off Hawaii. This year more data will be obtained from tests on a variety of seafloors.

Two Norfolk tests were at 8,000 feet into a soft clay bottom. The test at 12,200 feet was in stiffer, deep ocean (hemipelagic) clay. A sediment fluke, one and a half ft. by three ft., was fired, using a propellant charge of 3.2 pounds of Navy Pyro.

The CEL anchor was designed to hold 20,000 pounds indefinitely in all types of seafloors from soft clay to hard rock. nearly four miles beneath the ocean surface. The system propels a fluke through the water column and into the seafloor at 590 feet per second.

The anchor's launch system is a sawed-off surplus Army 90mm gun barrel. Other components include steel pipe to minimize recoil, an arming device, and electronics to fire the propellant.

Taylor said the overall objective is to develop a practical, reliable and efficient anchor to moor deep ocean systems, surface and subsurface structures. He added that the versatile anchor can be adapted to moor various platforms, including instrumentation devices, buoys, weather stations, and research vesesls.

Maintaining your 'cool' ... and your 'warm'

By NICHOLAS E. KNISKA

Family Housing Operations and Maintenance Division HQNAVFAC

• Alexandria, Va.

Everything associated with living uses energy. People who have purchased homes or are renting know each month that utility bills must be paid. When checks are written to pay for utilities, it is clear these services are costly. Thus cost is a motivating factor in reducing energy consumption.

This same incentive does not exist for occupants of government housing, since increased amounts and costs of utilities consumed have no direct impact on salaries received.

Most military personnel and their dependents, by nature or circumstances, realize the importance of making limited funds go as far as possible, but . . . management must help these same people become aware of our limited and costly energy resources.

More important than just making them aware of the limitations and costs is their direct participation in a joint effort with management in controlling usage of diminishing energy resources.

It takes more than writing a regulation, publication of informational materials, or threat of reprisal to generate interest and achieve results in energy conservation; it takes close cooperation between management and occupant. An understanding of the situation and a determined method which will make both management and occupant constantly aware of energy waste and how to control it is necessary. Excessive energy consumption is not solely the fault of housing occupants. Lack of effective maintenance is equally responsible and should be of prime concern to management as a means of reducing and subsequent elimination of wasteful consumption.

Positive programs by management with the participation of housing occupants in this joint effort are necessary for a meaningful conservation program in family housing.

At this point we may say, "So what's new?" The Navy has had a utility conservation program in effect for years and we have our eye on utility conservation. In fact we have made progress. So what's the problem?

The problem simply stated is this: How can we better utilize the conservation program to reduce consumption and to hold down costs over and above what we have already done?

There is no "one" solution to the problem because there are too many human factors involved. However, we can strive for better utilization through vigorous programs to identify the energy "thief" and control his actions.

To this end, the Naval Facilities Engineering Command has published the "Family Housing Energy Conservation Handbook." It is designed to identify where waste occurs in family housing units and outline methods to eliminate or reduce this waste. This publication discusses the roles of the Commanding Officer, Public Works Officer and the housing occupant in conserving energy.

It identifies specific items of household equipment which, if controlled by the occupant, will result in considerable reductions of energy usage. It also identifies maintenance which should be performed to reduce energy consumption, improvements which can be made to restrict air leakage, etc., and contains a suggested energy talk for gaining occupant cooperation in the energy conservation program.

Posters and stickers are provided for display in public places and in individual family units as constant reminders to the occupants to control the use of energy.

The Family Housing Energy Conservation Handbook, distributed to each Navy activity having military family housing, is intended for use as a guide on how management and occupant working together as a team can make the energy conservation program work. It provides methods on how better to utilize energy available, reduce consumption, and to hold down skyrocketing fuel costs without drastically altering the lifestyle to which we have become accustomed.

Naval Construction Force Review

By LCDR J. L. HORACEK, CEC, USN
Seabee Programs
HQNAVFAC

Construction on Diego Garcia by NMCB 10 continued rapidly with the largest effort in the cantonment area including the gymnasium, bachelor enlisted quarters (BEQ) 4, and the medical facility. The first 2500 foot section of underwater fuel line was completed and the second section was started at the POL (petroleum) facility. The general upgrade of Camp Cummins has also seen significant progress.

NMCB 133, deployed on Okinawa, is nearing completion of the Ammo security road and fence project; and the interior work at the Camp McTureous NCO club has continued.

The Philippine Detachment of NMCB 133 has completed construction of the runway support facility and the aircraft deprocessing facility. The battalion has now been relieved by NMCB 40 and redeployed to Gulfport, Miss.

The midpoint of the Guam deployment for NMCB 74 has seen the naval hospital swimming pool project proceed on schedule. The Naval Magazine security project and CPO mess project at the Naval Communications Station, Finegayan also made significant progress during this period. At Atsugi, Japan, the detachment completed the rehab of BEQ 76, while Detachment Adak in Alaska completed a multi-purpose building. NMCB 74 also has projects at Midway and at San Miguel, R of P.

In Europe, NMCB 1's highest priority project, the security ordnance area at Rota, is moving at a rapid pace with the berms for the open storage area at grade and bunkers nearing completion. Also a calibration lab project was completed last Fall. The ordnance magazine and naval exchange building at Sigonella are further progressing. The detachment at La Maddalena completed the commissary/exchange building and the detachment at Edzell, Scotland, continued work on the hazardous material storage security fence.

Prior to being relieved at Roosevelt Roads NMCB 3 completed many major projects prior to returning to CBC Port Hueneme, Calif. NMCB 5 continued construction of the Roosevelt Roads BEQ and Lima Pier at Guantanamo Bay as well as starting new projects at Antigua, Sabana Seca, and Vieques after their arrival in Puerto Rico.

NMCB 71 was recipient of the Peltier Award as the most outstanding Naval Mobile Construction Battalion for FY1974. The plaudits for NMCB 71's outstanding performance at the South Pole had barely died down when the battalion mounted out for its new deployment site at Bermuda where they commenced construction of an asphalt plant for a runway overlay project, as well as starting many station improvement projects.

Amphibious Construction Battalion One (PHIBCBONE) continued construction of 19 prefabricated buildings at the Naval Air Station, Miramar, Calif., and the environmental cleanup at Pearl Harbor, as well as providing a detachment in support of the West-Pac Amphibious Ready Grop Afloat.

PHIBCBTWO at Little Creek, Virginia, is assisting UDT personnel in cleaning Chubb Lake by removing underwater obstructions. The battalion also assisted in a Reserve landing exercise for the Marine Corps. PHIBCB TWO currently has detachments in the Caribbean and Mediterranean attached to PHIBLANT ships.

RNMCB-23 was announced winner of the John R. Perry Award for the Best-of-Type among the 17 reserve battalions. RNMCB-23 is commanded by CDR Gerry E. Higgs, CEC, USNR-R. Runner-up was RNMCB-22; while Most Improved went to RNMCB-28.

Construction Battalion Units (CBU) continued their efforts in spearheading the Seabee Ashore/Self-Help program of the Navy. In the past three years, CBUs have averaged $2.3 million worth of material in place last year. The FY-75 funded backlog of projects represents some $3.25 million worth of material.

Norfolk Public Works

Keeps on truckin'

By LTJG STEPHEN W. DAIGNAULT, CEC, USN
and
R. J. SHAFER
Public Works Center, Norfolk

• Norfolk, Va.

Every work day some 100 emergency and service (E/S) calls are submitted to the Recurring Work and Services Branch of the Public Works Center, Norfolk, Virginia. These requests, varying from unclogging a drain to repairing a boiler, are handled by men representing eight trades assigned to the E/S Work Center in the PWC Maintenance Department.

In providing support to the 120 customer commands both on the 5,000 acre Norfolk Naval Station and within a 20 mile radius, certain production problems are encountered:

— lost travel time in getting the mechanic from a central shop to the job site.

— non-productive time while the mechanic acquires additional materials, tools, or assistance.

— lack of on-site supervision once the mechanic is dispatched.

The core of these problems is the traditional E/S procedure of dispatching mechanics on a one man to one utility truck basis.

In order to cut travel time, reduce response time to calls, and provide more efficient support and supervision, a rolling maintenance shop project was initiated at the center. Used in conjunction with a work zone concept, the prototype of this plan has enabled the maintenance department substantially to reduce the average cost of service calls by increasing productivity.

The rolling shop program is designed to: (1) locate service crews in the areas where the work is concentrated, (2) give them the mobility to respond quickly to work requests, (3) readily supply mechanics with the materials and tools necessary to keep them on the job.

Launching the plan required defining zones, selecting the crew, and choosing and properly outfitting a vehicle.

Study of work chits suggested the naval base be divided into four zones by location, frequency of work requests, and ability to employ gainfully a rolling shop. Further study revealed the rolling shop concept was best adapted to the pipefitter and electrician trades since these are involved in the majority of emergency and service calls.

A 14,000 pound step-van with a 14-foot completely enclosed body was chosen for the task. It features a V-8 engine, automatic transmission, dual rear wheels, power steering, and auxiliary seating. The van was modified by the addition of a lightweight roof rack for ladders and pipe.

Tool chests were added under the seats, material bins were constructed and a security cage installed. Wiring was provided for lighting and alternating current supplied for power tools. A radio provides necessary communications.

A poll of the mechanics suggested materials and tools necessary to complete the anticipated assignments of the van. In order to maintain this inventory, each part bin is labeled with a stock number and a description of the item. The supervisor-driver notes on a master list which items need replenishment.

At the end of a day, an order is placed for critical items, while non-critical items are replaced at the end of each week.

Results of a trial period confirm that mechanics assigned to the rolling shop, assisted by two "satellite" utility trucks, working in specified work zones, averaged 1.2 hours less per service call than did comparable shop centered crews. This figure represents a large saving to the customer as well as increased responsiveness and efficiency.

Predictable advantages of the rolling shop program are:

— dollar savings to the customer because of fewer hours charged to the job.

— better efficiency through more jobs done per day per man.

— closer supervision by getting the supervisor, who serves as the driver, into the field to observe and direct job performance.

— savings to the Maintenance Department's overhead by a reduction of its truck fleet. Each van replaces four utility trucks.

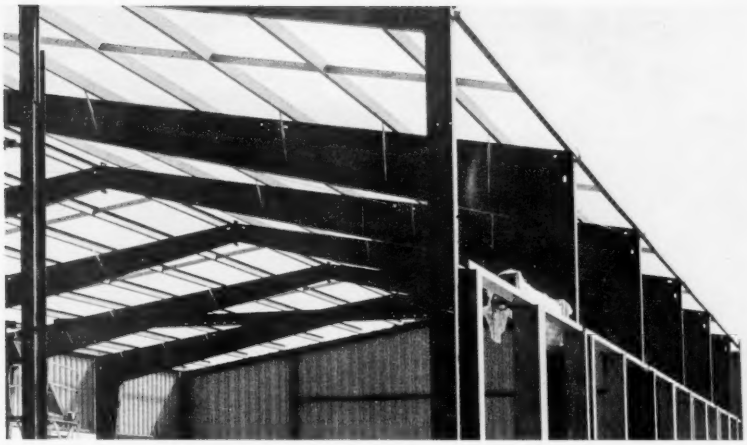
— improved morale, and customer satisfaciton, by encouraging the mechanics to identify with "their" customers in "their" work area.

Norfolk Public Works saves time and money with this step van.

The preliminary study stated that in order to improve significantly the E/S system of the maintenance department the rolling shop must replace three utility vehicles, show a direct work efficiency increase of 6 percent, eliminate four shop-to-job roundtrips per day, and gainfully employ four workers.

The results of the study period attest to the van having met these requirements and more.

The prototype shop has proven itself a worthy investment, and an additional three vans have been ordered. The rolling shop has made a place for itself in the PWC NORVA maintenance field.



NAS Whidbey gets a new self-help auto shop

Rafter beams for the central building of Whidbey's new self-help auto hobby shop.

•Oak Harbor, Wash.

Naval Air Station Whidbey Island opened a new - and somewhat unique - auto hobby shop on station last year. The shop features sixty lighted, sheltered work stalls; a complete tool room; two paint spray stalls; a steam cleaning stall; a welding shop; two lube racks; and a car wash.

The unique part of the shop is that it was built almost entirely with self-help labor by members of CBU-417 based at NAS Whidbey, with some help from other Navy men at the station.

Materials for the shop were purchased with a $364,00 grant from BUPERS. Estimates of the savings realized using self help, rather than contract labor, range upwards to $100,000.

A heated, lighted central building in the "U" shaped shop complex houses facilities to do such engine work as valve grinding and cylinder reboring, as well as facilities for both disk and drum brake work.

A technical library is included in the central building.

Plans and specifications for the project were provided by the Western Division, Naval Facilities Engineering Command. Materials were obtained by contract from local contractors and suppliers. Materials and services to install the automatic sprinkler system and paint spray booths were obtained from local contractors.

Bid packages for both the materials and the labor contracts were prepared by the Naval Air Station Public Works Engineering Department. The NAS Whidbey Recreation Director acted as the contracting officer.

Materials contracts were let in the fall of 1972 and material began arriving in the late fall of 1972 and winter of 1973.

Some site preparation was begun in the fall of 1972; however, work began in earnest in March, 1973.

Labor contracts to install the automatic sprinkler system and the two spray booths were let in the summer of 1973.

The project was completed and inspected in late March, 1974. A total of 4,000 Seabee mandays and 3,300 self-help mandays were expended in the construction of the facility. This workforce was supervised by SWC Robert E. Gilbert, USN.

Inspection for the project was provided from a variety of sources. A construction representative from the local ROICC office was assigned to the project from conception to completion.

In addition, Western Division NAVFAC provided representatives to inspect the sprinkler and fire alarm system and the cathodic protection system. The Puget Sound Naval Shipyard provided a boiler inspector to inspect and certify the boiler.

The bulk of collateral equipment for the shop arrived and was installed in April.

The shop opened for business on May 10, 1974.

Seabees pave the central compound of the auto hobby shop — built largely with self-help labor and a grant from BUPERS.

MOUNTED ON a Marine Corps logistics trailer, the CEL fuel system demonstrates one of its uses. A fuel hose, connected to the pump module, supplies fuel to nearby aircraft.

• Port Hueneme, Calif.

A portable fuel system capable of providing the U.S. Marine Corps with advanced logistic support under combat conditions is being developed by the Civil Engineering Laboratory (CEL), Naval Construction Battalion Center.

Development of the system centers on a modular concept that is compatible with international shipping container standards. The system was designed under the premise that a conventional 8x8x20 foot container can be subdivided into six modules and be moved quickly and efficiently by most major means of transportation.

The mobile fuel storage/distribution system is expected to meet demands and requirements of assault operations through the 1980s.

Mark E. Hollan, mechanical engineer in charge of the project, said present Marine Corps fuel systems have been capable of supplying sufficient fuel during assault operations, but they may fall short under more demanding requirements for jet fuel supply to vertical/short take off and landing (V/STOL) aircraft such as the *AV-8A*.

The CEL fuel system is anticipated to meet long-range demands while fulfilling current logistic requirements. This dual commitment was met by developing four primary design requirements.

- The system should be modular to be used as building blocks for larger systems as Marine Corps helicopters increase their lift capabilities.
- Modules must be transportable by truck where suitable roads are available.
- Fuel modules, normally carried empty until movement ashore, should occupy minimum space aboard ship during transport to advanced areas.
- The system must be compatible with container standards to facilitate shipment on container ships and handling by conventional container equipment.

Hollan said that under the CEL design, the new fuel system is composed of two types of modules, the pump module and the fuel module. Each module is fitted with international standard corner fittings and connectors. The pump module consists of a rigid frame containing an engine-driven pump plus a filter/separator, hose and hose reels, and other dispensing hardware necessary to deliver fuel at a rate up to approximately 100 gallons per minute.

The pump unit, having nominal dimensions of 8x6-2/3 x4 feet and weighing less than 5,000 pounds, can be operated by persons without previous fueling experience.

The fuel module contains a collapsible 1100-gallon coated fabric tank in a frame. When empty the module weighs about 1500 pounds and can be collapsed to about one-third its erected height. When erected and filled with 1100 gallons of fuel, it weighs approximately 9200 pounds and has the same dimensions as the pump module.

Three collapsed fuel modules, connected together using their standard corner fittings and connectors, are the same size as one pump module, or one erected fuel module. Pump modules, erected fuel modules and collapsed fuel modules can be connecetd in a variety of combinations to form 8x8x20 foot containers having standard dimensions.

An important feature of the CEL system is that it can be transported readily by plane, train, ship, and truck configured for international standard containers and easily separated for transport by vehicles having limited capacity. This adaptability to various modes of transportation is especially valuable in combat areas where Marines will rely heavily upon helicopters and truck/trailers for sufficient supplies of aircraft fuel.

The modular system permits a load to be varied for maximum use of the load-carrying capabilities of present and future helicopters. The CH-53D, which has the greatest lift capability of any helicopter now in Marine Corps service, can transport up to one full fuel module and a pump module. If the fuel load carried per trip must be

Civil Engineering Laboratory

New Fuel Support For The USMC

Collapsible fuel modules in standardized containers offers varied uses.

By JEROME THOMAS
Civil Engineering Laboratory

increased, the helicopter can carry two fuel modules, each filled to 70% of maximum capacity. The shipboard-compatible CH-53E, which may go into service later this decade, is expected to lift up to three full fuel modules plus one pump module. The pump module's weight is also well within the lift capability of the smaller CH-46 presently used by the Marine Corps.

The system readily adapts to transportation on the ground. Hollan said it is important to realize that when suitable roads are available, five fuel modules and one pump module can be connected in an 8x8x20 foot standard container configuration and installed on a standard container trailer now being developed by the Marine Corps. This module deployment results in a self-contained 5500-gallon refueler truck. A single fuel module placed on a 5-ton truck creates a tanker capable of meeting the normal daily needs of a Marine combat unit ashore, which is approximately 1000 gallons. Hollan said the necessity for single-purpose tanker trucks could then be eliminated.

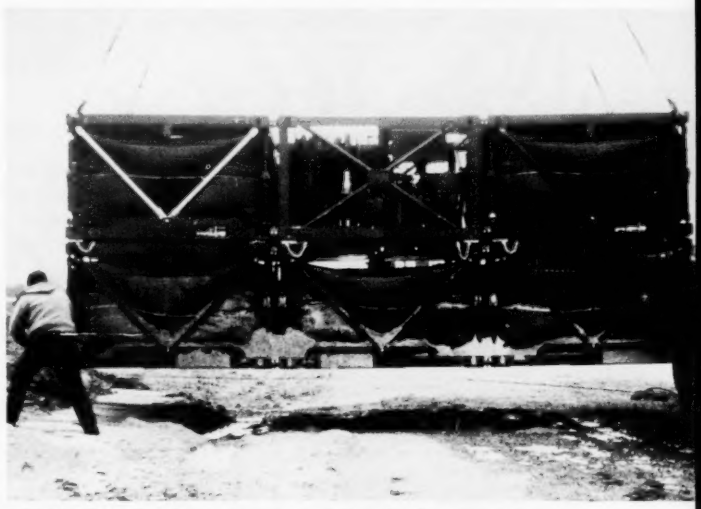
Since the fuel module and frame are collapsible, the weight per unit of volume and surface area can be tripled during the return of empty modules for refilling and they are easier to transport by helicopter by external sling. Another important feature of the collapsed module is that it occupies only one-third as much space during storage or transport. Eighteen collapsed modules, three modules wide by six modules high, result in a standard 8x8x20 foot bulk size which can be handled and transported like a conventional container.

The fuel tank modules can also be adapted to store potable water, as the structural design was based on the density of water. If a module is designated to transport drinkable water, it will simply be equipped with a different type of fitting to prevent its accidental use as a fuel module. This approach provides a potable water transport system which incorporates all the advantages of the fuel delivery package but precludes the need or cost of significant design changes.

Within a year, CEL intends to extend the system's front-line service capability. The ultimate container configuration could produce a 3-in-1 package consisting of: a fuel system capable of supplying 2200 gallons of fuel; an 1100-gallon potable water system; and a specially-designed module to house a remote-controlled fire-fighting system. And by using the pump module within the water unit, Marines will be able to demineralize available water to satisfy the AV-8A's fluid requirements for thrust augmentation.

The Marine Corps and CEL are participating in a series of tests and evaluations to determine: the number of men needed to operate the system; the type of support equipment required; and the most efficient configuration of modules for effective transport by helicopter and truck/trailer. A significant test will be the transporting of fuel by helicopter in support of AV-8A operations.

Demonstrating the total system's durability of construction, a 56,500-pound fuel unit (containing 5500 gallons of water) was dropped one foot to a concrete slab. Minor structural damage to one module was sustained but was so slight that testing was successfully continued to completion without repairs. Hollan said that to his knowledge no other international standard special-container has successfully survived a similar drop onto concrete.



SIX MODULES (one pump and five fuel) comprise the portable fuel system being developed by the Navy's Civil Engineering Laboratory for the Marine Corps. The 8x8x20 foot configuration weighs 56,500 pounds while holding 5,500 gallons of water. The system sustained no major damage after an intentional one-foot drop to concrete.

High Rise Fire Safety

Smoke Movement Control

By W. BROOKS
Chesapeake Division
NAVFAC

Hotel Roosevelt, Jacksonville, Fla. — 22; Tae Yon Kak Hotel, Seoul, Korea — 163; Rault Center, New Orleans, La. — 6; Avianca Building, Bogota, Colombia — 4; Joelma Building, Sao Paulo, Brazil — 179; U.S. Navy High Rise, Anywhere — ?

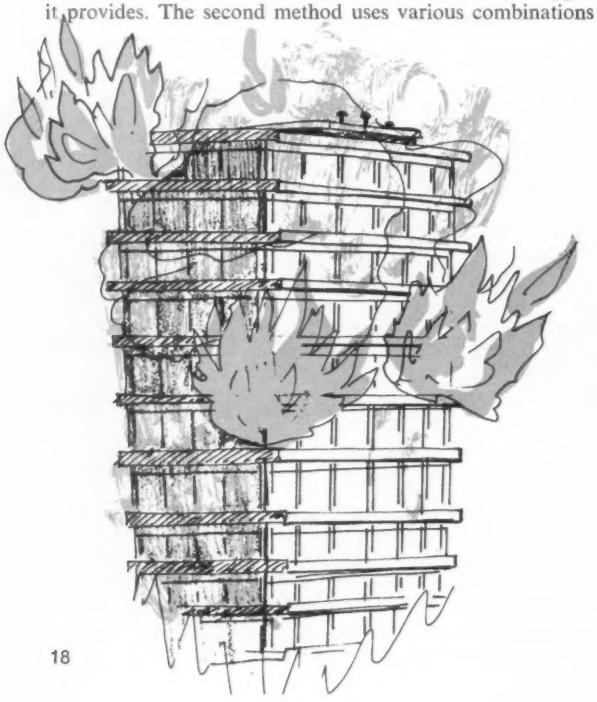
The figures in the previous paragraph indicate the number of deaths in a selected group of high rise building fires. We do not want to add Navy fatalities to a similar list.

A high rise building, according to most building codes, has been defined as a building with floors used for human occupancy which *are more than 75 feet* above the ground.

For many reasons, a high rise building fire presents a greater threat to life than a fire in a comparably sized single story structure. One of the major reasons is that a high rise building can fill with smoke before it can be completely evacuated.

Smoke can and will fill a high rise building through the same stairways and elevator shafts used for evacuation. To safely isolate building occupants from smoke, they must remain in a secure area or evacuate through a smoke-free path. Both methods require that smoke control systems be provided.

Smoke control consists of keeping it from entering occupied areas or other specified areas such as stairwells or elevator shafts in quantities that can cause injury or death. Two general methods can be used for smoke control. One method requires dilution of the smoke so that the concentration of harmful products is not dangerous to health. This method is not recommended for the immediate vicinity of a fire because of the increased oxygen it provides. The second method uses various combinations of pressurization and ventilation in order to exclude smoke. This method is the one most widely used in new construction and the one which will be discussed further.



Heated smoke generated at the site of a fire often causes two-thirds of the volume of air on a floor to be forced out of that floor. A limited number of smoke escape routes are available. Among these are stairshafts, elevator shafts, and all vertical duct shafts. Some leakage will occur through exterior building openings, but with modern air handling requirements, today's buildings are virtually "air tight".

Once into the vertical shafts and now relatively cool, the smoke moves upward by what is known as the stack effect. The speed of upward movement depends on various factors such as outside wind direction and velocity, outside and inside temperatures. The stack effect is most pronounced in winter, when the greatest difference exists between the inside and outside temperatures.

There are four general ways to keep smoke from escape routes or areas of refuge:

- Provide a smoke shaft which extends from the basement through the roof. Each floor level contains a damper into the shaft which is normally closed. Upon sensing smoke or heat on any particular floor, the damper would automatically open, allowing the smoke to enter the shaft and be exhausted at the roof by a properly sized air handling unit.
- Divide each floor into two or more zones, each with separate air supply and return systems. Occupants could move from a fire area into a safe area, which would be supplied with fresh air. The fire area would be exhausted to the outside while the fire was being extinguished.
- Introduce adequate fresh air into stairwells and other shafts so that the shaft pressure would be greater than the pressure on any of the floors. Since smoke would be excluded from these shafts, they could be used for evacuation or for access by fire fighters.
- Separate the buildings into several zones, each zone containing three to six floors. Air supply and exhaust for each zone is on a separate system. When a fire is detected, the exhaust system would be activated for that zone, while all other zones would be placed in an air supply operation. Smoke could be contained within a known portion of the building. Building occupants could evacuate the fire zone by moving either upward or downward to a smoke free zone.

All of these smoke control methods rely on both mechanical and electrical equipment.

Proper safeguards must be designed into such systems to assure that they are sufficiently isolated to withstand a fire of relatively long duration and do not in themselves constitute a source of ignition.

Even though Navy high rise buildings are not the height of typical metropolitan structures the problems of potential smoke spread are just as important.

Smoke movement can be controlled with proper building design. In most cases, this added benefit may be obtained without appreciably increasing the building cost.

Rigors of restoration

By LT LEE E. SIMON, CEC, USN
Officer-in-Charge, NCBU 401
Naval Training Center, Great Lakes

Wherein are related the travails and tribulations of renovating the ubiquitous "temporary" WWII building

The main operating suite at a Naval Hospital had needed rehabilitation for several years, but the project was too large to be accomplished as an alteration by special project and too long-standing to be an urgent minor construction project.

The three usable operating rooms (OR) had ceramic tile from the floor to the seven-foot-level; the passage way between OR's had ceramic tile up to the four-foot-level only. There were large windows in the OR's which caused significant differences in temperature from one end of the OR table to the other.

". . . scalpel . . . sutures . . . flashlight!"

The project was re-submitted late in 1971 with the help of Nick MacHara, P.E., of LANTDIV as a repair and alteration special project. Design was funded and accomplished in mid FY72. A contract was awarded very late in FY72. Construction began after the 1972 Labor Day weekend and was completed just before the end of FY73.

Rehabilitation of the main operating room (MOR) was intended to improve space utilization, ease of cleaning, and climatic control. During the past 30 years, the equipment associated with the MOR had changed and, with each change, a minor modification of space utilization was made.

By 1971 for example, Anesthesiology had grown out of two small rooms into a passageway while an eight-foot-wide operating room had become obsolete and unused.

As outlined below, the scope of the project included elimination of the major problems, plus several minor nuisances. Replacing windows with a solid wall eliminated temperature fluctuation from one end of the room to the other. Tiling walls up to the ceiling eliminated a cleaning and maintenance problem.

Anesthesiology was relocated and the unused space in the small OR was used. A fourth, full sized, OR was constructed, as was a second scrub room which significantly shortened the distance from the scrub room to OR number three.

The pack room was improved when it was relocated to allow construction of OR number four and, as a by-product, the maintenance crew could service equipment without crossing the sterile line into highly scrubbed areas of the MOR.

Temperature and humidity were controlled individually in each operating room. OR lights were slightly rewired which allowed the variable light control to operate effectively.

Prior to the minor wiring alteration, the variable light control would be destroyed by direct current which provided power to the OR lights for the few seconds between the time external power was lost and the alternating current emergency generators started automatically.

Design constraints

The scope of alterations was limited because rehabilitation of the Main Operating Room was submitted as a repair and alteration special project for funding by the major claimant (BUMED).

At the time of design, BUMED had authority to undertake up to $50,000 of alteration exclusive of repairs in a single project. The repair portion was never near the major claimant's limit of authority but keeping the alteration portion of the project under $50,000 required some reduction of scope.

Fortunately, the A&E firm succeeded in reducing the project's scope without eliminating any major items.

A second major constraint was the amount of space available. The MOR was located on the top floor of the

hospital which was a three story concrete structure with brick exterior walls and masonry interior partitions.

The back of the MOR was separated from a large mechanical room by a fire wall. The sides of the MOR were exterior walls. The front of the MOR adjoined an elevator shaft, stairwell, and the X-ray spaces.

Moving equipment from the X-ray spaces to allow expansion of the MOR would have been a large project by itself. With expansion infeasible, rehabilitation of the MOR had to make more effective use of existing floor space.

Time for construction was the final design constraint. Although temporary operating rooms were provided elsewhere, the surgical capabilities of the hospital were limited severely during construction. Command emphasized the need for designers to use the quickest method of accomplishing repairs and alterations.

Construction problems

Before beginning work, the contractor anticipated between a week and ten days of demolition, but demolition proved much more time consuming. To install ceramic tile, plaster had to be removed from the upper portion of the operating room walls.

The walls were made of hollow clay tile blocks covered with a scratch coat, brown coat and then white coat of plaster which had to be removed if new and old ceramic tile surface depths were to match.

The scratch coat was firmly bonded to the tile blocks and required patient hand work to remove without shattering the tile blocks. Removing the bullnose ceramic tiles at the top of the existing tile portion of the wall often shattered tiles below the bullnose.

As a result, the demolition for tile installation required several weeks instead of several days.

The hollow clay tile block partitions crumbled easily where walls were to be removed but, unfortunately, the block also had a tendency to crumble where walls were to remain. For example, as a small opening was cut in the wall about two feet below a pair of X-ray view boxes, several tiles collapsed leaving the X-ray view boxes to support several feet of wall!

Extreme caution had to be used as walls were opened to insert conduit or other piping.

In order to avoid a color clash where plaster was to be replaced, a complementary color was chosen. Cutting into the walls caused esthetic problems as well as construction problems. Everywhere the wall was opened, new tile had to be installed which did not match the old existing tile.

Because oxygen lines, suction lines, and electrical conduit needed replacement, the tile walls looked like a patchwork of repairs.

When the hospital was built, no attempt was made to level ceilings in different rooms. When walls were removed, ceiling heights often varied six inches. During patching of the existing ceilings, rusted lathe was discovered which required replacement of the ceilings in the original three OR's.

Because replacing the ceiling had not been anticipated, a delay in the occupancy of the MOR resulted.

The most significant minor problem OR personnel discovered during construction was discovery that the standard hospital doors were too small to allow a bed into the OR because the OR door closure occupied three inches more space than the standard hospital door closure.

"Just a minute, Ted."

Because the problem was discovered early it was humorous rather than tragic. The most significant minor problem to the AROICC was a dripping hose that flooded the Senior Disbursing Clerk's typewriter shortly before payday!

In addition to these problems, there were normal labor consuming problems associated with rehabilitation work. There never seems to be enough room to run a new piece of pipe or conduit in an existing pipe chase.

No matter how careful the contractor is, one fitting always seems to be left open when the water or steam is restored, and someone is flooded.

Nobody on the second deck wants his ceiling to be opened as a part of rehabilitation of the third deck.

As all too often happens, one of the subcontractors did not perform as well as the prime and other subcontractors. Operating Room number three's thermostat and humidistat controlled Operating Room number four (and vice versa) because the A/E numbered rooms differently than the customer.

Major nuisances

In any contract that requires a justifiable time extension, the customer suffers a delay in occupancy. A time extension was required to allow the OR doors to be widened.

After the OR doors had been widened and the OR's had been completed except for patching the ceiling, the deteriorated OR ceiling lathe was discovered and the ceiling had to be replaced.

Almost without exception, in the rehabilitation of the MOR, problems which caused change orders developed one at a time.

The three existing OR's were not as esthetically pleasing as the new OR. The new OR's had new walls and thus did not have the odd colored ceramic tiles which accented the location of repairs or alterations in the old operating rooms. Even after rehabilitation, the old operating rooms displayed their age.

Equipment damage was another nuisance. During demolition of the masonry walls, tremendous amounts of dust were created. The dust drifted into equipment which was thought to have been completely covered, as well as into some uncovered equipment in adjacent areas.

Dust penetrated OR light tracts, sterilizers, and other OR equipment.

In addition to dust, some OR equipment was dented as it was relocated. Fortunately, no major damage was incurred.

After the OR was occupied an odd problem was discovered. Noise from the third deck machine room was unusually loud in OR number three. OR number three had significantly more machine room noise than the clean instrument room which adjoined the same machine room.

After investigation, it was deduced the tile blocks forming the walls between the machine room and OR number three had been shattered on the OR side during demolition. A previous access hole on the machine room side allowed noise to be ducted from the machine room, through the shattered blocks, to behind the ceramic tile in OR number three.

Local forces solved this problem by sealing the access hole in the machine room.

Portions went well

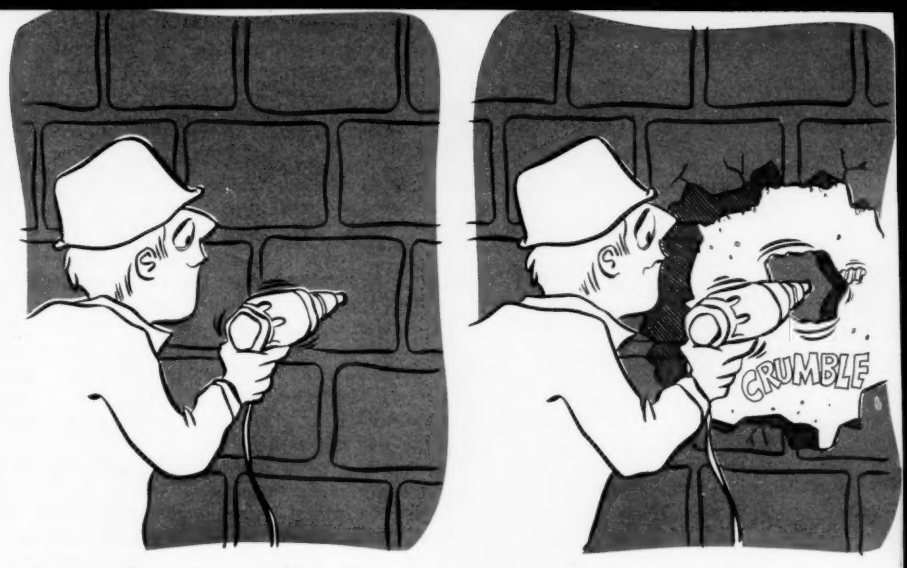
A new OR room, scrub room, and sub-sterile room were the principal alteration in the repair and alteration project. The new room was constructed by demolishing several interior masonry partitions which were relocated and replaced with lathe and plaster over steel studs.

Demolition for the new rooms went quickly because little care was required in demolishing walls which were to be removed. The steel stud framing for the walls was installed quickly on the existing concrete deck.

Plumbing and electrical materials to be hidden in the walls were installed quickly, as in new construction, because the craftsmen had easy access to the open spaces between studs which had not yet been concealed.

After the plumbers and electricians finished, metal lathe was attached to the steel studs with screws. The new metal lathe made an ideal surface for the plaster which supported subsequent ceramic tile wall surface.

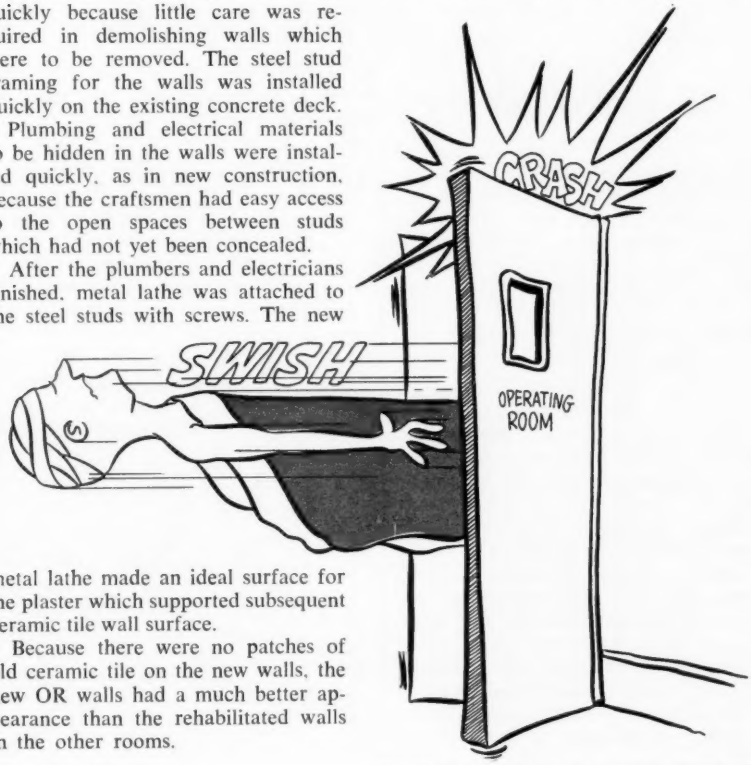
Because there were no patches of old ceramic tile on the new walls, the new OR walls had a much better appearance than the rehabilitated walls in the other rooms.



A comparison of the problems in the rehabilitation of the MOR with the things that went well should give some insight in how to complete a similar rehabilitation with much less grief.

Almost all problems involved trying to modify an existing piece of a structure with the least amount of new construction, i.e., install an electrical outlet or adding a pipe within an existing wall, removing plaster to allow installation of ceramic tile, etc.

The things that went well were almost entirely new construction, i.e., demolition of obsolete walls, installation of new partitions, etc.



Needed: wider doors or narrower gurneys!

Realizing that new construction is normally considered cheaper and quicker than repair, how can one improve performance rehabilitation contracts on similar structures. The answer lies in either emphasizing in design, or at least giving the contractor the option of using repair by replacement.

Repair by replacement is standard procedure for repair of large components such as 50-ton air conditioning compressor-condensor units, which have deteriorated through age.

Conclusion

For example, where there is essentially no alteration of existing walls and only repair of existing walls is desired, consideration should be given to replacing the old wall as a component.

Demolishing the old wall, replacing it with a new wall using modern materials and construction methods would be repair by replacement. Any relocation of outlets or changing of surfaces of the new wall from the old wall would be alterations, but so would any relocaiton of outlets or changing of wall surfaces on the old wall.

Repair by replacement is an effective method of trading increased material costs for decreased labor costs in order to achieve a net savings to the taxpayer.

Based on the experience of the rehabilitation of the MOR, we felt a more esthetically pleasing product could have been achieved in less time and at lower cost had existing partitions been replaced rather than patched.

It is urged that replacement of major components be considered as a means of repair in any major rehabilitation project in a structure similar to the Naval Hospital.

ON ADVICE OF COUNSEL

By WILLIAM H. SPECK
Counsel
HQNAVFAC

"A good example is the best sermon."

— Benjamin Franklin

Standards of conduct for Government officers and employees are set by a conglomeration of overlapping, somewhat inconsistent and sometimes illogical statutes, executive orders, and regulations. The rules are most comprehensively brought together in DOD Directive 5500.7, 54 pages in all. To capsulize the obligations, risking distortions and incompleteness, they command:

Thou shalt not act for the Government in dealing with an outside party where you have any conflict of interest from property or employment interest in the outsider or negotiations with the outsider.

The prohibition applies no matter how small the interest (even a few shares of stock), unless the appointing officer gives advance written waiver, and comprehends interests of family members. You shall not accept compensation for government service from outside sources. After leaving government service, conversely, you shall not represent others against the Government where you participated personally and substantially for the Government or, for one year, where the matter was within your official responsibility.

Confidential Statements of Employment and Financial Interest, required of higher level personnel who make contracts, merely serve to report conflicting interests and do not excuse conflicts for those reporting or for the majority not obliged to report.

Thou shalt not accept any gratuity (anything of value or favor) from those with whom you do business on behalf of the Government.

Exceptions are few (e.g., trophies in public contests, circumstances where Government's interest is served with a report to the Head of the Procuring Activity). A contractor's airplane flight and luncheon are prohibited equally with his gift. Any private transactions with those with whom you do business for the Government become suspect.

The prohibition applies to gratuities from outside parties with whom you do business "directly or indirectly;" particular attention must be paid that the liquor bottles merely left at your desk or in your car and the farewell party are not gifts from the business. The prohibition goes far beyond actual bribery (i.e., payment of a consideration in return for an action).

Thou shalt not contract with the Government while in its service; and officers in many circumstances after retirement may not "sell" to the Government.

The Department of Defense will not knowingly contract with its employees "except for the most compelling reasons," and retired officers may not sell to their department or for three years to any uniformed service.

Thou shalt use government facilities, property, and personnel only for official business.

Prohibited practices are use of Government vehicles for private shopping or home-to-work transportation or government offices for private business.

Thou shalt not use your Government position, or information obtained in that position, for private advantage.

Use of Government information not available outside or use of official titles with outside businesses, solicitations of inferiors, and preferences among those with whom you deal are forbidden.

Even these commandments are not comprehensive enough, for the officer or employee must not engage in any conduct prejudicial to the Government and must avoid even the appearance of impropriety.

Books and Essays as viewed by :

T. C. MURPHY
Director, Engineering Management Division
CECOS

Managerial Merry-go-round, by Theodore Levitt, Harvard Business Review, July-August 1974, P 120-128

For a generation or more, managers have been under a constant barrage of nostrums, snake-oils, and inspirational messages from Olympus. Aphrodisiacs such as T-Groups, O.D., MBO, Theory X, Y, and Z, etc. have been liberally ladled to all takers.

No wonder some managers are confused, adrift in a sea of remedies, without a compass — or a paddle.

So it's refreshing to read: "The effective manager is either naturally and almost unconsciously good or he is no good. At best, he can improve on what comes naturally to him only by the most limited amount of fine tuning of what he already feels most appropriate for himself. To try to change himself into the prescribed modes of some textbook manual is to attempt to transform himself into something that he surely cannot be and that others will quickly see as being false, and therefore ineffective.

"The manager may be sincere in trying to improve both himself and his methods, but respect and triumph go not to the sincere personality (who honestly tries to be nice and do 'right' things), but to the authentic personality — the person who is and pretends to be none other than himself."

I have discovered a comprehensive, timely, and instructive set of four articles on the subject of value engineering:

- *Value Analysis: New Concept Takes Root*, by Alphonse J. Dellisola, a pioneer in development of the VE technique (formerly of NAVFAC) explains the VE commitment of the major federal agencies. Mr. Dellisola is currently Vice President and Director, VE Division, of McKee-Berger-Mansueto, Washington, D. C.
- *Value Engineering: Weighing The Alternatives*, by Charles J. Allen, executive vice president, Albert Kahn Associates, Architects-Engineers, Detroit, explains how value engineering can and should be used in design.
- *EPA Sees It Coming*, by John T. Rhett, deputy administrator, EPA, discusses VE guidelines for EPA, scheduled for publication in January, 1975.
- *GSA Says It's Here*, by Larry F. Roush, deputy administrator, GSA, discusses VE guidelines for EPA, achieved by VE in three years of construction activity by GSA.

All of these are to be found in a single issue of the *Consulting Engineer For November, 1974*. Highly professional, useful treatment of an important subject, characteristic of the consistent excellence of the Consulting Engineer's contents.

INTRODUCING

PUBLIC WORKS TECHNICAL NOTES

This new section of *The Navy Civil Engineer* is designed for the ready exchange of practical 'know-how' information particularly concerning problems experienced in Public Works Departments. Contributions are not only welcomed but urged from field installations. All contributions should be sent directly to John S. Biggs, PW Technical Notes Coordinator, Code 1013, Headquarters, Naval Facilities Engineering Command, 200 Stovall Street, Alexandria, VA 22332.

Underwater Inspection Now Readily Available

Underwater Construction Team One (UCT ONE) has completed a quality control inspection for the Officer-In-Charge of Construction (OICC), U. S. Naval Academy. The underwater construction team inspected sub surface modifications to the Reina Mercedes Pier performed under an OICC contract.

As one result of the team's work, several discrepancies were documented that will require the contractor's return for satisfactory improvements.

This represents the first time that the Navy's UCTs have been used by an OICC office to inspect contractual work. This use of the UCTs opens the necessary monitoring to all OICC offices who do not have civilian divers available and is further extremely beneficial to the UCTs as part of their readiness training.

OICC offices and Construction Battalion Units (CBUs) desiring to use the UCTs for underwater quality control inspections can obtain additional information from the Ocean Facilities Program Office, Naval Facilities Engineering Command, 200 Stovall Street, Alexandria, VA 22332 (Autovon: 221-0505; Commercial (202) 325-0505).

Urethane Foam For Metal Roofs

Sprayed in-place urethane foam roofing was applied to the metal roofs of the steel buildings at Naval Reserve Center, Clifton, N.J.

Several types of protective coatings were used and are being evaluated. Station personnel have reported a considerable reduction in fuel consumption during the heating season as well as more comfortable temperatures during the summer months.

They also report an end to the roof leaks which have plagued them for many years.

A one-inch wide styrofoam strip was inserted in plaster around the metal windows of the Regional Medical Center at Great Lakes, Ill. to prevent excessive leaking of the plaster during the winter months. This has reduced the replastering cycle from one year to three years.

For The Birds

Birds are often a problem around structures because of unsightly droppings and nesting materials. For many years pest control personnel have searched for materials to repel birds. Once the birds have selected a site and started to nest, little can be done.

A variety of materials has been tried and several work effectively. Tactile repellent materials registered with the Environmental Protection Agency (EPA) include: (a) aromatic petroleum solvents, (b) castor oil, (c) diphenylaminc, (d) mineral oil, (e) pentachlorophenol, (f) petrolatum, (g) polybutane, (h) polyethylene, (i) quinine, (j) resins (pine) and (k) zinc oxides. Ordinary chassis grease while it may be effective is not registered with EPA for repelling birds of any type.

Additional information may be obtained from William A. Gebhart, Code 104B1, Hq NAVFAC, (202) 325-8175, Autovon 221-8175.

CEL has procured an infrared system for field testing its capabilities in detecting heating and cooling losses in naval facilities and equipment. This portable, lightweight, battery-operated set provides a live, TV-like picture of the temperature distribution of objects covered by the IR scanner. To make the set suitable for as many applications as possible, a variety of accessories was also obtained, such as normal and telephoto lenses, auxiliary cables for remote viewing, a camera attachment for recording thermal images, and a monitor for displaying and recording images in color. It is expected that a video tape recording and playback capability will be added soon.

The set has been field tested so far on air-conditioning losses in desert area housing, insulation breakdown on above ground and buried hot water and steam lines, hot spots in power line substations, and for abnormal heating of VLF antenna base and guy line insulators.

Plans are to continue field testing the equipment on applications such as heating or cooling losses through cracks or defective insulation in buildings, pipelines, refrigerated warehouses, and other places where a temperature anomaly is indicative of energy losses. Any activities having possible applications for an IR survey which would assist them in energy conservation efforts and also help in evaluating the equipment should contact the laboratory.

Contact: *J. C. King, Autovon 360-5973; (805) 982-5973*

Continued From Preceding Page

A three-phase portable electric power quality monitor was developed by the CEL to detect and record power line anomalies exceeding preset thresholds of frequency and voltage. Two ranges of pulse voltage transients can also be detected and recorded by this monitor. The monitor counts the number of occurrences of each event and records the event and the time of occurrence on a time-and-event print-out recorder.

Primary use of this monitor is to check the quality of electrical power supplied to electrical equipment such as computers and critical communication equipment. To date, ten naval activities have used this monitor to establish the quality of power supplied to computer complexes and communication facilities. At each of these facilities it was established that malfunctions and failures of computer or communication equipment was not the result of electrical power system disturbances.

To expand the capabilities of this power line disturbance monitor, a direction of propagation detector was developed at CEL for locating the source (power source or load) of pulse type transients in electrical power distribution systems. This detector provides a convenient method for locating sources of pulse voltage transients since it is lightweight, small, easy to operate, reasonable in cost, and does not disrupt normal operations of equipment serviced by the power distribution system. Although capable of functioning independently, the detector can be connected to the monitor, to provide a print-out indicating the source of each transient. Two prototype models of the detector are currently undergoing evaluation at selected NAVFAC field activities.
Contact: *Evo Giorgi, Autovon 360-5778; (805) 982-5778*

Better Insulation of Fuel Lines

Recently, two sections of a 3-inch steel steam condensate return line were excavated after one-and-a-half years service. A hydrophobic white mineral powder insulation had been poured around the pipe and been separated from the soil at the sides of the original trench by vertical 1 x 12 boards. The upper layer of insulation was covered with polyethylene film on which were placed empty, flattened insulation powder bags. Where the powder was dry, the surface temperature of the pipe was 150-5°F and at the inside edge of the vertical board (approximately 3 inches away from the pipe) the temperature was 121°F; where the powder was damp, the temperature values were 165°F and 156 F. Removal of the powder revealed that the pipe was in excellent condition.

The Air Force has had success with two field installations of this material on condensate return lines and also around an electrical splice on a 2400 volt approach light circuit.

A tri-service committee is evaluating this material through the National Bureau of Standards.
Contact: *T. Roe, Jr., Autovon 360-4772; (805) 982-4772*

INTROD

PUBLIC TECHNICA

It is said there's always a way to build a be clean a grease trap) and this new section of *T* exchange of better ways to perform Public W information are urged to contact the contribut are urged from field installations and shou'd b ordinator, Code 1013, Headquarters, Naval Street, Alexandria, VA 22332; Autovon 221-81 subjects is Eugene H. Early, Code L03C, Civil Battalion Center, Port Hueneme, CA 93043;

Exterior Waterproofing

Clear, waterproof sealers are of interest to many field activities where excessive wetting of exterior concrete and masonry walls by heavy rains or frequent water sprinkling is a problem.

CEL is currently evaluating five such coatings at Port Hueneme and Kwajalein. However, the Naval Air Station, Point Mugu, Calif., and the Marine Corps Air Station, Yuma, Ariz., have had success with a proprietary sealer. At Point Mugu, this sealer has been used on masonry and stucco walls on the station and at San Nicholas Island for up to six years. The coatings reportedly are performing well. At Yuma, the same product applied to the combed brick wall of a housing unit was performing well in October 1973 after 27 months of service.

Contact: *T. Roe, Jr., Autovon 360-4772; (805) 982-4772*

New requirements for more insulation in buildings may shorten the life of built-up roofing. Passage of heat and cold from a building through the insulation to the roof membrane protects the membrane from extreme temperature variations. Increasing the amount of insulation between the roof deck and built-up roof will sharply reduce this flow. The result is a greater degree of expansion and contraction that could cause a more rapid deterioration of the membrane.

Upgrading the built-up membrane to provide a stronger system will provide some protection from the damages resulting from the movement. Also, gravel surfaced roofs can be coated with an insulative gravel bonder. This material reflects the sun's heat thereby reducing the temperature of the roofing membrane. It also aids in bonding the gravel. Similarly, smooth surfaced built-up roofing should be coated with a material to reflect heat and extend membrane life. Aluminum pigmented asphalt coatings are normally satisfactory and economical.

Contact: L. S. Austin, SOUTHNAVFACENGCOM (Code 102) 2144 Melbourne Street, Charleston, SC 29411 AUTOVON: 794-4155

ODUCING

-WORKS

CAL NOTES

a better mousetrap (see page 26 for better ways to of *The Navy Civil Engineer* is designed for ready ic Works functions. Readers who desire additional ributor directly for specific details. Contributions u'd be directed to John S. Biggs, PW Technical Co- aval Facilities Engineering Command, 200 Stovall 21-8182 or (703) 325-8182. Coordinator for RDT&E Civil Engineering Laboratory, Naval Construction 043; Autovon 360-4070 or (805) 982-4070.

Continued On Following Page

Solar Uses Surveyed

Usage of solar energy can be relatively cost effective in many circumstances, depending on type of system, geographical location, fuel costs, and other pertinent factors. It is, therefore, prudent of those concerned with energy savings to keep themselves abreast of the art and be tuned in to practical solar energy applications at their command. Toward this effort, the Navy's Civil Engineering Laboratory (CEL) has compiled an up-to-date directory of solar energy collector and system component manufacturers. The laboratory also maintains a solar energy bibliography relevant to Department of Defense activities.

CEL is currently working with several Naval Public Works Centers on the economic feasibility and basic design parameters for using solar energy in their training pool heating applications. In addition, engineers are working with personnel at the Naval Ammunition Depot in Hawthorne, Nevada, on solar energy demonstration projects. Involvement here includes building space heating and potable water heating tests.

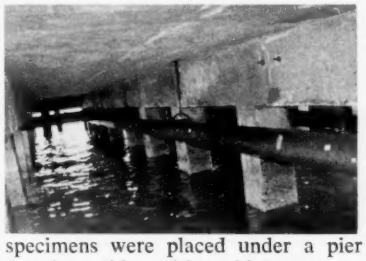
Demonstration test experience and evaluation, along with other solar energy system design criteria, will be used in the development of a Navy-wide NAVFAC Solar Energy Design Manual (for building space heating and potable hot water heating applications), scheduled for completion in June 1975. The laboratory expects to become heavily involved in solar energy RDT&E of building space heating and cooling.

Contact: *Lt. James Baker, Autovon 360-5554; (805) 982-5554.*

Impregnated Tape Prevents Corrosion

Most utility lines under piers and wharves are made of iron or galvanized steel. These underpier lines are not only subjected to high humidity and salt spray but are often intermittently submerged in seawater at high tide in some areas. They soon become badly corroded. The problem is compounded during maintenance because of the difficulty of preparing a good surface before recoating of the utility lines.

The Civil Engineering Laboratory, in its investigation of new and improved methods for protecting these lines from corrosion and reducing maintenance costs, has placed several coated specimens in the field. These pipe specimens were sandblasted, wire-brushed, coated or tape-wrapped, and then placed on racks at Kwajalein (Marshall Islands) and Kaneohe Hawaii) for marine atmospheric exposure. At Port Hueneme, Calif.,



specimens were placed under a pier for above tide and intertidal exposure. At Pearl Harbor, in-place test sections were installed on existing fuel lines. These specimens are inspected, rated, and photographed at intervals.

Although all coated specimens are showing varying degrees of corrosion, the Mil-P-24441 (epoxy-polyamide) coating was providing slightly better protection than other coatings under the investigation. A proprietary grease-impregnated tape has provided the best protection against corrosion. After two years of exposure no additional corrosion was observed under the wrapping when it was cut to examine the substrate. However, the grease appeared to leach out of the tape which became soggy when subjected to prolonged submersion in the seawater.

Contact: *Eddy S. Matsui, Autovon 360-5340; (805) 982-5340*

Fuel Costs Reduced With Waste Oil

Waste fuel and lubricants from aircraft, ships, supply facilities and transportation operations are becoming more attractive economically when considering their dollar equivalent as a fuel. NAVFAC is receiving increasing reports of shore activites putting waste or slop oil to use in boilers and, in some cases, diesel generators. Public Works Center, Subic Bay, Republic of the Philippines, for instance, has reported actual savings of roughly $200,000 in FY74 and greater savings projected for FY75 by obtaining waste fuel from the Naval Supply Depot, clarifying and blending for use in diesel power generation. Direct benefits accrue to customers in utility rate reductions. Preliminary technical guidance will be published shortly compiling the collection, segregation and blending of slop oil. Comments and lessons learned in this area would be helpful. Mail yours to NAVFAC, Director of Energy and Utilities Division.

A WORD OF CAUTION: NAVFAC STRONGLY RECOMMENDS AGAINST THE RE-USE OF LOW FLASH POINT (140° F or less) FUEL FOR BLENDING.

Cable Splicing In Fuel Pits: A No-No

A corrective procedure has been established at Naval Air Station Miramar to reduce damage to high voltage DC electrical cables at aircraft fueling pits.

The damage generally occurs at the sealing eye located between the cable and the switch. When the cables are damaged beyond repair, they are cut off outside the sealing eye and a new cable is then spliced at the cutoff point by passing the sealing eye. This type splicing does not conform to the electrical code and presents a hazard in the pits if sparking should occur.

A procedure used at Naval Air Station Miramar to overcome this problem is to install a junction box just ahead of the sealing eye. This will eliminate cable splicing in the fueling pit.

Additional information may be obtained from E. M. Harbert, NAS Miramar.

STAINLESS Steel? Not Always

We are all familiar with the excellent corrosion resistance of many stainless steel objects in our everyday lives. Stainless steel flatware remains shiny after years of service, stainless steel pans give similar results. However, for most marine applications where seawater or salt spray can contact the stainless steel, rapid corrosion can often occur. This is particularly true if the seawater or salt spray is captured and held in small crevices such as those commonly found in bolted connections.

The type of corrosion most commonly found in such applications is crevice corrosion. This type of corrosion is particularly insidious because it occurs in hidden areas and is normally only revealed by failure. This type of corrosion is also particularly difficult to prevent by the application of protective coatings. Unless the coating excludes all of the salt water from the crevices, it will not prevent crevice corrosion.

Stainless steels are also subject to pitting corrosion, stress corrosion, cracking, and rapid attack at welds.

While it cannot be said that all stainless steels are unsuitable for all marine applications it must be emphasized that the use of stainless steel in marine applications must be based upon test data or experience with the stainless steel in question in a similar environment under similar conditions of exposure. Otherwise the selection of stainless steel can prove to be a serious mistake.

Contact: *J. F. Jenkins, Autovon 360-4797; (805) 982-4797*

CEL received an inquiry regarding a proposed piping insulation installation at Adak in a conduit which is periodically flooded. The contractor desired to use a proprietary glass fiber insulation rather than calcium silicate insulation.

Based on CEL's experience, it was known that foamed glass insulation was not acceptable for this use as a substitute for calcium silicate insulation. A manufacturer's representative of the proprietary glass fiber insulation verified CEL's position.

Calcium silicate insulation is recommended in instances similar to the Adak situation.

Let's Hear It!

Share your field experience with others in the Naval Facilities Engineering Command. Submit your proven methods of better ways to perform Public Works functions for inclusion in this section of *The Navy Civil Engineer*. See pages 23 and 24 for details.

The New PUBLIC WORKS Technical Notes

There's A Better Way To Clean A Grease Trap

The Civil Engineering Laboratory has evaluated proprietary enzyme-catalyzed cleaning compounds for use in the maintenance and treatment of grease traps — to learn if an effective, safe, enzyme-catalyzed cleaning compound might reduce the cost of maintaining grease traps. This study included an assessment of the effect of the compound on sewage systems. One naval activity has reported a cost of more than $8,000 per year to pump a large grease trap and interceptor tanks.

A number of enzyme-catalyzed cleaning compounds are now commercially available and five were tested. The seven laboratory tests conducted were: anaerobic bacteria test, clogged-drain test, digestion of organic materials, corrosion test, effect on plastic tubing, pH test, and salmonella test.

One compound was found to be the most economical one to use because only half as much is required for the same performance as for the other products. The various compounds were rated on economy and safety. One naval activity reported that the frequency of pumping grease traps was reduced to as little as one fourth as often as before, since the use of one of the tested cleaning compounds was initiated.

Contact: *Eddy S. Matsui, Autovon 360-5340; (805) 982-5340*

What To Do About Efflorescence...

Efflorescence is a white, powdery deposit of one or more salts on the surface of brick, concrete, or masonry walls. These water-soluble salts are carried from the interior of walls to the surfaces by the migration of moisture through the wall from the side of higher humidity to the side of lower humidity. (In contrast to efflorescence, laitance is a somewhat similar looking deposit of fine cement powder which floats to the surface of concrete after it has been poured.)

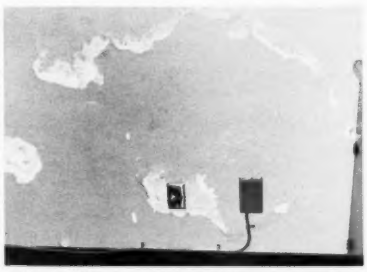
Paint peeling on exterior wall as a result of efflorescence.

In addition to the unsightly appearance of efflorescence on unpainted walls, it may cause paint peeling on walls. It must be removed completely before walls are either initially painted or repainted.

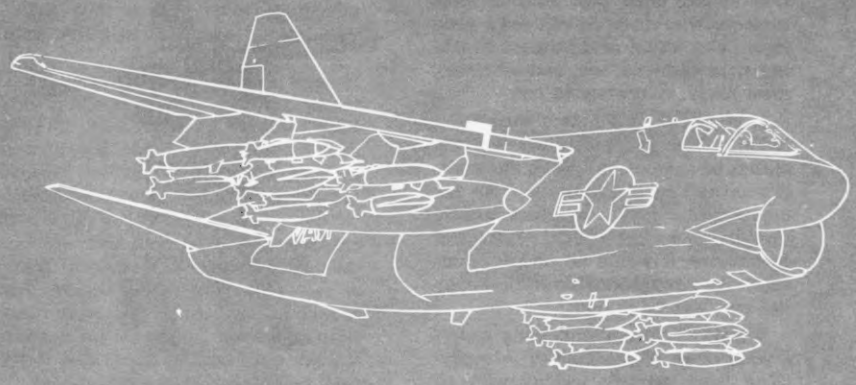
Efflorescence can be prevented or minimized by coating the surface where higher humidity occurs with a water-proofing paint (e.g. TT-P-95) in order to prevent moisture migration through the wall. With hollow block walls, where less humidity occurs inside a building, vent holes can be drilled into the interior to allow moisture to escape.

In order to remove efflorescence, the surface of the wall should first be dry scraped or brushed to remove the loose deposits and then be treated with either a 5 to 10% solution of muriatic acid (hydrochloric acid) or a solution of 3% zinc chloride and 2% phosphoric acid. Detailed instructions for these procedures are found in paragraph 4.4.3.4b of NAVFAC MO-110.

Contact: *Dr. R. W. Drisko, Autovon 360-4658; (805) 982-4658*

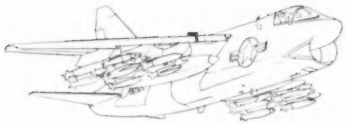


Paint peeling on interior wall as a result of efflorescence.



'nobody wants to fight... but somebody has to...'

By LT Richard F. Cowan, CEC, USN



It could be any university in America. Ten or fifteen men are standing outside a classroom building, waiting. Their dress is casual and conversation flows easily.

Questions and answers jump comfortably from one to the other.

A question not often asked in this group turns heads toward one individual. His answer: "Nobody wants to fight, but somebody has to know how."

"Nobody wants to fight, but somebody has to know how," is one of a large family of "folksy truths" a speaker can use, secure in the feeling that what he is saying is so familiar that it will be instantly accepted as truth by his listeners, whether or not it is truthful, or even applicable.

For example, people can be spurred into premature action by the saying, "A stitch in time saves nine," whether or not stitches save anything. Similarly, they can be placated by the saying "One must take the bitter with the sweet," no matter how bitter the bitter or how scarce the sweet.

The "truths" handed down to us in this form are based on a wide spectrum of logic, ranging from excellent to incredible.

Even given the variability of such proverbs, "Nobody wants to fight, but somebody must know how," is among the worst. It is illogical, inaccurate, and doesn't mean what it says. To appreciate fully the hokum of this phrase, it must be broken down, word by word, for a closer examination.

Nobody. Nobody wants to fight? One of the most intense discussions in the behavioral sciences over the last century has been whether or not aggressive tendencies are innate in man or are taught him by the institutions surrounding him.

The issue is far from decided, but it is clear that in any society, anywhere in the world, some person will act more aggressively than his neighbors. It is probably not difficult to find among one's past acquaintances someone who sincerely enjoyed a good fight; who would never dream of taking steps to avoid one, and who was, most likely, competent in one.

It is crucial to Marxian social evolution that everyone in the working classes be anxious to fight in the worker's revolution for freedom from the oppression of capitalism. Since historic time is often marked off by wars and revolutions, it would be surprising indeed if, throughout history, *nobody* had ever wanted to fight.

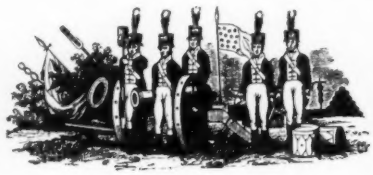
Wants. To want something covers a wide range of possibilities — everything from actively seeking with all one's energies and resources, to being only unwilling to select an alternative. That is, choosing by default.

It is unpopular in post-Vietnam America to advocate any war for any cause, yet war might be readily chosen by some Americans and reluctantly chosen by many more if, say, genocide of the Israeli people were genuinely threatened. Nor must one look too far back in history to find a popular war, for example, the U.S. citizenry's pushing an unenthusiastic government into war with Spain.

Thus "want" may be somewhere between a matter of a practical, rational decision based on reliable facts, and a matter of blindly emotional frenzy. The use of "want" in this particular phrase allows each listener to assign it his own meaning.

To fight. The "total war," typified by the mobilization of Britain from 1939 to 1945 was not characterized by the presence of every man, woman, and child, blind, lame, or feeble, in the trenches. Rather, the speeches of the time emphasized that each person must do his best for Britain in whatever task was appropriately assigned.

Thus, if some nation today decided "we" must fight, many of those advocating war would visualize themselves



fighting from the desk of a draft board, or leading an aluminum recycle drive while watching the news from the front on television. Those few whose youth and lack of influence mark them for actual involvement would dream of victory, parades, flowers and wine, or the acclaim of their comrades for some heroic act.

To fight, therefore, has many meanings, and the meaning least likely to form in an inexperienced imagination is one of dirt, burned flesh, or death. Veterans of actual combat often characterize the experience as "unreal, as in a dream." This is partly due to the total lack of pre-conceptualization.

But. "But" is used here in the same way it is used in the phrase, "Not to change the subject, but . . ." when one is about to change the subject.

"But" is a disclaimer for what has come before. It is a way of saying "I don't really believe what I said either, but let's hurry on to more important things."

There is a convention in public speaking which allows a speaker to ask a rhetorical question, damaging to his opponent, and leave the question unanswered. The attacking speaker is allowed, by this convention, to hurry then on to better supported points.

In the phrase under consideration, "but" places the phrase under the umbrella of such a convention. In essence, it is agreed between speaker and listener that the meat of the phrase is yet to come and there is no need to quibble over what has gone before.

Somebody. The vagueness of this word makes it extremely powerful. It is interesting that the anonymity contained in this old phrase highlights one of the crucial public questions of our times: "Who is this 'somebody'?"

Who does end up in trenches? Is it the rich and powerful, or more often, the poor and uneducated? The leader who must make a war decision may never see the front.

The senator who votes appropriations will stay informed — and stay away.

This phrase passes over the issue of who is the somebody, and thus passes over the questions of mercenary forces, conscripted forces, or "coaxed" forces, such as the New Navy or the Modern Volunteer Army. This is a significant oversight, to say the least.

Has. This word is the meat of the entire phrase. It contains the imperative has, or must. Somebody has to know how. The question so difficult to answer is, why must someone know how? Why must nations keep armies?

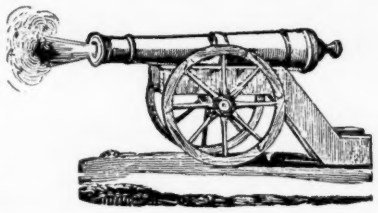
The answers accepted for so long have been the same well-worn ring as the phrase now under examination. For instance, "The poor peoples would run over us." This fails to explain wars between poor nations, such as Pakistan and Bangladesh.

It is axiomatic that armies are always for defense, never for offense. One wonders why it took the U.S. so long to make a Defense Department out of its War Department.

Nevertheless, if one is a realist and assumes wars have and will happen, then it is folly to be unprepared for them. A thinker can never quite fully justify standing armies without accepting some unscholarly notions of an ugly enemy crouching on the border waiting for an opportune moment to strike.

Perhaps the mere presence of some standing army is essential to the subjective feeling of security people desire, whether or not it contributes to a "real" or objective security.

To know how. To know how to fight is popularly held to be the business of the career military. But, as is often pointed out in the annual congressional squabbles over the rising cost of the U.S. military pension, it is, in fact, the citizen-soldier, the draftee who has done the lion's share of America's fighting.



The performance of pre-mobilization armies has been unimpressive in recent history. The armies of Britain, China and the U.S. were badly shoved around early in World War II by more mobilized nations until the "amateurs" arrived with enthusiasm, if not skill. Is a standing force "which knows how" an attainable goal?

Commanders report worse morale and discipline problems among garrisoned troops than among front line troops. Standing armies, garrisoned and unused, decay quickly. And if the standing army doesn't "know how," does the citizenry know how?

In Switzerland, Cuba, and Taiwan, which have universal military service, the citizenry may; but from Chicago and Tallahassee, enthusiasm will have to do.

So the phrase, "Nobody wants to fight, but somebody has to know how," a phrase hardly strong in the whole, crumbles to pieces when examined in the parts. It is trite, dishonest and unconvincing.

You may ask, then, who used this poor piece of logic? Who gave his group of friends such an empty phrase? The answer is that I used it, and because I feel I am not so different from other young career officers, I think many of us might have used this phrase, or some other "comfortable" phrase in a similar situation.

Why did I use it? Because I was being challenged, badgered, if you will — by a group of men, civilian engineers, whose intelligence I still respect, and who could not understand why I wanted to "hide" in the service. Their question was, "Why are you staying in the Navy?," and on a post-Vietnam American campus, this is a far, far different question than "Why are you with IBM?," or "Why are you in sales?"

The concept of military service held by many educated Americans who have not served is hardly flattering to those of us who make that service a career. The questioning situation in which I found myself is not unique. Any young military person who does not limit his friendship to others in uniform will be similarly challenged.

My friends' question was not meant to hurt. My trite response was not meant to answer. But there is an answer. I chose the Navy, because, in my lifetime, I want to use my energy and efforts to make a mark, to "matter." When my life's work is done, I want to know that some significant, positive contribution happened because I made it happen.

This desire to do something with which I will be satisfied is stronger than my own desire for wealth, and stronger, too, than the desire that my contribution receive wide public acclaim. By placing me in positions of responsibility so much faster than would a civilian employer, the Navy is giving me capabilities and experiences which will make possible that contribution I hope for.

That is the answer I should have given my friends. They deserved that answer.

The lesson in this is that if you are sometime asked to explain your choice of a career, and the situation will arise soon, do so with careful reasoning, by sifting your thoughts, and giving a sincere response.

To rely on the trite, empty phrase serves only to strengthen the circle described by Alexis de Tocqueville over 100 years ago: "Hence arises a circle of cause and consequence from which it is difficult to escape: the best part of the nation shuns the military profession because that profession is not honored, and the profession is not honored because the best part of the nation has ceased to follow it."

That circle will never be broken by phrases such as "Nobody wants to fight, but somebody has to know how."

A rebuttal

Maintenance Management

William C. Hall, P.E., wrote in the Summer, 1974, issue of Navy Civil Engineer on the problems of maintenance management. In the article, he identified four "possibly major factors" limiting the maintenance manager in maintaining properly.

These four factors were the "maintenance management monster, the maintenance management machine age, the maintenance management monotony, and the maintenance management manacles."

The monster, according to Hall, was the rapidly growing set of principles, procedures, and techniques that tend to "perplex and confuse" managers. Hall said he believed the "monster" buried managers in paperwork.

The machine age, said Hall, meant the trend by managers to rely on technology for solutions to management problems. Hall said bigger and better computers control maintenance "not one iota."

Monotony, said Hall, tends to bore managers with maintenance problems and tempts them to "direct . . . attention to other more exciting or lucrative work."

Manacles, said Hall, are put on maintenance managers by upper-level insistance on certain management reports, procedures, and techniques. Hall said the hands of maintenance managers "are pretty well tied by the policies handed down by headquarters, the field divisions, and management bureaus and sponsors."

The article titled "Is There Man or Beast in Maintenance Management", published in *The Navy Civil Engineer*, Summer 1974 issue, contains, in my opinion, several statements that require clarification.

Since the Navy Civil Engineer receives wide distribution amongst the ranks of maintenance management practitioners in Public Works Centers and public works departments, it would be prudent to address these statements.

True, articles published in the magazine do not reflect command policy; nevertheless, statements published should be based on "fact". Naval Facilities Engineering Command (NAVFAC) welcomes constructive criticism of any of its programs for all concerned that wish to do better.

An author should therefore, before preparing his manuscript, conduct a thorough research to ensure that his article is technically accurate. This article reflects the maintenance management system described in Maintenance Management for Public Works and Public Utilities, NAVFAC MO-321; Inspection for Maintenance of Public Works and Public Utilities, NAVFAC MO-321; Maintenance Management of Public Works and Public Utilities for Small Activities, NAVFAC MO-321.1; and Organization and Functions for Public Works Departments, NAVDOCKS 6-318. The article does not reflect any major claimant's unique real property maintenance management system, procedures, or reports.

Thes manuals are "advisory" not "directive" in nature. Major claimants adapt, tailor, and use the "system" as they deem necessary.

The term "maintenance management" is widely interpreted at the field activity level. Most field activity personnel, when asked how they manage their maintenance effort, will reply to the effect that "we don't exactly follow the book here, since we have a unique set of operating conditions". The "don't exactly" in this case can range from a slight variation in the processing of specific job orders to a complete absence of any control.

A second category of answer heard is to the effect that "we can't afford the overhead costs for all the inspectors, planners and estimators and work reception personnel".

Still a third answer might be that "we don't have time to fool with the paperwork — we judge ourselves by results".

Perhaps, other such maintenance management "interpretations" have been heard.

The point is that the "system" described in the above manuals has neither universal acceptance, nor universal understanding in the Navy.

It is not unusual to find, activity-to-activity, the maintenance management system either being installed, rejuvenated, explained, or defended. Or, any combination of these conditions at any point in time. Albeit, it is a good "system". When utilized properly, it will achieve results in terms of better maintained facilities at lower cost to command.

It is not a complex system; it is basically a formalization of common sense into step-by-step procedures which enable shops output optimization.

The maintenance management system shown in NAVFAC MO-321, NAVFAC MO-321.1, and MO-322 outlines basic objectives, fundamentals, concepts, and elements of control; and translates these basic tenets into a fairly simple, but often misunderstood set of procedures aimed at increasing maintenance productivity through the use of continuous inspection, work input control or "programming", planning and estimatitng, shop scheduling, and management analysis of results.

Application of these tenets should vary somewhat to suit local conditions or capabilities. As a matter of fact, the public works function of the Naval Ship Research and Development Center, Annapolis Branch, is categorized as a "small" size for it has approximately 80 personnel in the maintenance and utilities division, combined.

Therefore, the modified system recommended for this activity is described in NAVFAC MO-321.1. If this point had been recognized, understood, and used, by the articles' author many of the statements published would have been noted as being without basis in fact.

Statement: "Many different people contribute to its growth and development and consequently the principles,

The 'beasts' of

I — The Monster

Revisited

By BERNARD T. LEWIS
Head, Industrial Engineering Branch
HQNAVFAC

procedures, and techniques multiply rapidly. Each contributor has his own ideas; eventually the field activity maintenance manager is perplexed and confused. He has become so buried in paper work that he is overwhelmed by it".

"By their insisting on certain management reports, procedures and techniques, our hands are pretty well tied by the policies handed down by NAVFAC, the field division, and management bureaus and sponsors. No one can standardize maintenance or management control. Each activity should be given enough latitude to develop its own standards, procedures, reports etc. with final approval resting with the management bureaus."

Rebuttal: NAVFAC MO-321.1 is comprised of forty-three pages including front matter; index; sections on resources management, facilities projects, applied biology services; and illustrations. *Not very many pages left for maintenance management principles, procedures, and techniques.*

There are eight suggested, *not required*, formats, including three for job orders and material lists. There is one suggested monthly on-station report "Maintenance/Utilities Labor Control Report", and one required annual off-station report "Type 'A' Annual Inspection Summary". This does not represent enough paper work to bury any maintenance manager. Without this bare minimum of paper work we would be back in the pre-1950 dark ages of a foremans' hip pocket notebook management, a very costly non-productive form of maintenance management. The "system" depicted is tailored, and can be further tailored, if desired, by major claimants.

NAVFAC, and its Engineering Field Divisions, in the unilinear Navy of today, provide maintenance management advice and assistance when requested and have no authority to tie major claimants hands.

The basic "system" described in NAVFAC MO-321 has not changed since the early '50s. The only thing that changed over the years is the format used for system prosecution. The principles, procedures, and techniques have not multiplied. This is based on personal experience with the system since the beginning.

Statement: "By machine age", I mean the basic trend to rely more and more on technology for the solution of maintenance management problems, we expect the computers to do our work for us."

Rebuttal: NAVFAC has published no advisory ADP assisted maintenance management system. There is in draft form a Public Works Department Management System (PWDMS), not yet ready for Navy-wide export. Any computer readouts or reports, required of NSRDC, Annapolis is not called for by any currently published NAVFAC maintenance management manual.

Statement: "As I stated before maintenance and maintenance controls cannot be standardized at the many varied naval activities".

Rebuttal: Maintenance is standardized, not by any prescribed system or procedure, but by the nature of the work itself. Craft work is the same CONUS wide. The end product is the same, although the work methods may vary. Hanging a door in Maryland is the same as hanging a door in California. Managing maintenance may vary from activity to activity, but plumbing work in a shipyard is the same as plumbing work at an air station.

Standard maintenance controls techniques are suggested in NAVFAC MO-321.1. Any wide variation from the basic principles of planning, executing, and controlling maintenance work leads to "breakdown" maintenance.

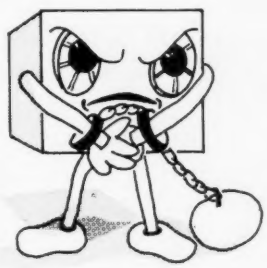
Maintenance control isn't standardized; elements of control for managing maintenance work are standardized. Whether the elements of control are recognized formally, or not, they are still used in any degree of maintenance management effort.

There has to be some standardization otherwise Public Works Officers would have an extremely difficult time in assuming duties, if they had to unlearn and learn a brand new system, at each new duty station. Furthermore, the major claimant would have an extremely difficult time trying to manage

Maintenance Management: How real are they?

II — The Machine Age

III — The Monotony



IV — The Manacle

Maintenance Management 'Man or beast' reexamined

his activities if each one had its own public works organization and maintenance system, and each one decided which on-station and off-station reports it would generate. Monitoring, in this respect, would be extremely difficult. Recognize that many off-station reports are called for by Congress, Office of Management and Budget (OMB), and the Department of Defense (DoD), not just Navy Command.

Statement: "Are planning and estimating necessary. Yes." "Most P&E and maintenance control divisions appear to be overstaffed, however, and are encumbered by the Engineering Performance Standards (EPS), Universal Maintenance Standards (UMS), or other type standards. These are fine, and I feel every P&E should know how to use them and how they are derived, but they are very cumbersome and time consuming for most types of work done by the maintenance shops. Again we're back to the personnel involved. A good P&E can do a better job of planning and estimating the work to be accomplished without the use of EPS, etc."

Rebuttal: If a P&E can do a better planning and estimating job using judgement, historical data, or conventional construction estimating manuals, rather than using EPS, a set of standard time data, specifically industrial engineered for maintenance work; then industrial engineering as a discipline should be cancelled from the engineering profession.

Picking numbers from the air can never be as factual or reliable as engineered job time estimates, regardless of any conditions stipulated.

Consider the following data and information taken from NAVFAC files regarding EPS affect on P&E productivity:

Planner-Estimator Hours Required To Prepare Labor Hour Estimates

	Estimation Condition	
Work Order	Non-Eps Activity	Eps Est.
1	0.928	1.120
2	1.433	1.348
3	1.095	1.145
4	2.108	1.378
TOTAL	5.584	4.991

This chart gives an interesting bit of information; It indicates the P&E's at non-EPS activities on the average take longer to estimate jobs than P&E's using EPS take to estimate the same job.

It was found from this particular study that even though EPS estimates varied radically, still they are almost twice as good as estimates not using EPS. What were the reasons for this variance? An analysis of the job phase calculation sheets indicated that somewhere communications have broken down, because many of the P&E's in listing their references did not use the proper page and group times. In fact, it was doubtful if one or two were even using the proper craft manual.

Statement: "Based on the total mandays of work that a P&E group can produce per day (and this varies greatly with the individual P&E and the type of work being estimated), the P&E staff size should be related to maintenance staff number."

Rebuttal: This has always been the case since Controlled Maintenance started. The original, and still effective, rule-of-thumb is that one P&E should support 20-25 craftsmen "available" to work on planned, estimated, and scheduled maintenance jobs. Further, NAVFAC MO-321.1, Table 1, relates the number of planner and estimator/inspectors required per number of craftsmen assigned to the Maintenance/Utilities Division, combined, for small Public Works Departments.

Statement: "Most shop supervisors I have seen are not properly indoctrinated into the big picture. They are not cost-conscious. A typical example is when a man is sent out to repair a drinking fountain. He knows that the fountain is beyond economical repair and so indicates on the work request. Yet he will charge two or three hours on a repair which will require further repair in a week or two rather than spend the two hours replacing the fountain. I have seen many such examples — from doors and windows to motors."

Rebuttal: Blame for the situation described above should not be placed on shop supervisors, rather it should be placed squarely on the shoulders of the Maintenance Control Director for allowing it to happen. Job orders issued to the shops should call for the right type of work; in this case, a replacement instead of a repair. Key maintenance managers have to, in most cases, live with the personnel resources available to them. They can either be used as they are, or steps taken to make them better. Shop supervisors, as a group, should not be blamed for poor maintenance management.

Statement: "When we lost three of our four inspectors (who did both contract and continuous inspection), we assigned continuous inspection to the P&Es."

Rebuttal: The Planner & Estimator/Inspector job title has been in use since the mid '60s. Assigning the work of three inspectors to P&Es doesn't make the P&Es more productive, it only means both Continuous Inspection and job planning and estimating functions are not being properly performed. Doing less work in these areas tends to decrease the level of maintenance at a command by causing more repair vs maintenance work, poorer planned jobs, and less maintenance craftsmen productivity.

Statement: "We have combined the functions of maintenance control director and engineering branch manager into one position."

Rebuttal: NAVDOCKS P-318, published in 1960, calls for this type combination for small activities. NAVFAC MO-321.1, pubished in 1972, also calls for the same combination.

Statement: "Workload has remained fairly constant and we still get out the job orders and contracts without any major problems."

Rebuttal: Pushing out job orders, with allowed craft manhours not based on EPS, will usually produce no major problems for in most cases, allowed craft manhours are so inflated by P&Es that shop supervisors have no reason to complain. However, issue job orders with reasonably accurate allowed craft manhours, and follow-up by comparing actual to planned times, and problems will arise. These are good problems for they are the kind when solved that produce increased shops productivity and effectiveness.

Summary: "We should be managing properly — now — today". But, why reinvent the wheel? Why throw out 20 years of solid proven experience? Why take a system that has been moulded by countless man years of "cut and try," and say, at my activity, despite the press of other business, a better system can be developed? There are activities in the Navy which have been awarded, and rewarded, with the status of Model Public Works Departments. These activities use existing NAVFAC public works management systems, and find they do work. If some activities can do it, why not others? The reason is *people* as Mr. Hall states. Since we all are working to support the fleets and commands, why not work together to improve our lot?

A MAN OF MERIT

• Subic Bay, R.P.

Capt Joseph A. D'Emidio, CO, Public Works Center, Subic Bay, received the Legion of Merit recently for developing the Navy's first program for environmental protection.

Capt D'Emidio was cited "for exceptionally meritorious conduct in the performance of outstanding service" as Director, Environmental Protection Division, Office of the Chief of Naval Operations, from September, 1970 through April, 1974.

BROKEN GROUND

• Philadelphia

A ground-breaking ceremony at Philadelphia Naval Base marked the start of construction of 350 family housing units for military personnel.

The $9,539,500 project will consist of 14 four-bedroom units for junior officers; 78 four-bedroom and 30 three-bedroom units for senior enlisted; and 52 three-bedroom and 176 two-bedroom units for junior enlisted.

Principal speaker at the ground-breaking was RAdm Albert R. Marschall, CEC, USN, Commander, NAVFAC, and Navy Civil Engineer Corps Chief.

$ MILLION MILESTONE

• San Diego

CBU 405, at San Diego Naval Station, reached a milestone in the Eleventh Naval District by completing its first $1 million in construction projects under the Self-Help Program established in 1970.

The Seabees renovated 26 Bachelor Enlisted Quarters, constructed softball fields, handball courts, parking lots, and a number of recreational facilities, including tennis courts, basketball courts, football fields, picnic tables, shelters, and barbecues.

The O-in-C of CBU-405 is LTJG Thomas A. Bacon, CEC, USN.

NOEL REYNOLDS, the first woman construction representative trainee in NAVFAC has joined the staff of ROICC, San Diego. Here, she picks up tips on quality control inspection techniques. Noel, an architecture graduate from Grossmont College, is presently assigned to the Naval Construction Team, Point Loma. (Photo courtesy of San Diego "Union.")

GOOD FELLOWS — CDR George Robinson, CEC, a White House Fellow who serves as a special assistant to Housing and Urban Development Secretary James Lynn, was frocked to his new rank in a ceremony presided over by his temporary 'boss' and by RAdm A. R. Marschall, Chief of Civil Engineers. CDR Robinson is only the third naval officer selected for the White House Fellows program during its ten-year existence.

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Naval Facilities Engineering Command
SITUATION REPORT

MOBILE UTILITIES SUPPORT EQUIPMENT (MUSE) PROGRAM - Technical assistance is now in effect to improve program readiness and minimize equipment degradation caused by operation and maintenance practices. This includes on-site equipment inspection, technical assistance to users, trouble-shooting and equipment repairs, assisting in MUSE installation for forward areas, and training activity personnel in operation and maintenance procedures. The inspection backlog is high but it is planned to have all equipment inspected by the end of FY76.

ENVIRONMENTAL ASPECTS OF DREDGING - This responsibility has been centered in the Environmental Quality Division (Code 104) of NAVFACHQ. Accordingly, a strategy plan for the accumulation of baseline data was developed. The first survey for this information has been conducted at Norfolk, Virginia, in October 1974, by the Navy Environmental Support Office (NESO). The next survey was scheduled for Charleston, South Carolina, in December, with most field survey work targeted for completion by June 1975. The accumulated data, available from NESO, will aid materially in preparing statements on the environmental aspects of dredging projects and will expedite the issuance of dredging permits.

SMALL BOAT DOCKING FACILITY - NAVFAC has recently designed a small floating drydock especially useful for docking fast riverine craft, service craft and yard craft. The dock may be located at an advanced base or any naval installation that must dock small boats. The dock is composed of a modified ammi pontoon with P-1 can wing walls. It provides a deck surface of 90 ft. by 28 ft. and is capable of docking vessels up to 150 tons. The dock is operated by a 250 cfm air compressor through an air manifold and piping system.

OIL SPILL EQUIPMENT ILS PLAN COMPLETED - An Integrated Logistics Support Plan (ILSP) for Harbor Oil Spill Removal/Recovery Systems has been completed and is being distributed for field information and use. This is the primary document used to identify what required functions will be accomplished, who will be responsible for their accomplishment, and how and when they will be accomplished. It reflects the Naval Facilities Engineering Command philosophy of a complete system approach used for planning, analyzing, designing and managing.

MILCON THREE YEAR ECONOMIC PAYBACK INVESTMENT PROJECTS - The Navy has been most successful in obtaining approval of new construction projects costing under $300,000, which have a real dollar payback of less than three years.

To date, nine projects amounting to over $1.5 million in new construction have been approved with over $1.0 million in projects presently being processed for approval. This program is proving to be one of the most effective means of obtaining timely new construction and alteration work while simultaneously reducing overall Navy costs.

PROTECTIVE CONSTRUCTION - A new computer program for determining ballistic penetration has been added to the Computer-Aided-Design library and is available to Engineering Field Divisions on the CDC system.

CATALOG OF NAVY SYSTEMS COMMANDS SYSTEMS ANALYSIS/ OPERATIONS RESEARCH MODELS (NAVFAC P-443) - The third edition of this catalog has been published and is now available for distribution. As an item of general interest, the number of SA/OR models in this edition is 27 percent greater than were reported in the second edition two years ago. Requests for this catalog should be directed to NAVFAC Headquarters, Attention Code 203A.

NAVAL ENVIRONMENTAL PROTECTION SUPPORT SERVICE (NEPSS) - This CNM/NAVFACENGCOM centrally managed/regionally implemented technical support service has proven cost effective. During recent permit negotiations with the Environmental Protection Agency for the treatment of waste waters, in compliance with the National Pollutant Discharge Elimination System (NPDES), significant construction/plant modification costs were avoided. This was possible through the use of NEPSS monitoring data and analysis by highly qualified NEPSS personnel. To date, 162 NPDES permits have been issued to shore based facilities throughout the Navy. Sixty-eight proposed permits were cancelled at the negotiating table, based on effective bargaining and sound engineering backup. Five year cost avoidance resulting is $2,130,500. The experience gained through NPDES should prove valuable in avoiding unnecessary expenditures in meeting new pollution requirements. Since monitoring requirements will eventually be the responsibility of each activity/major claimant, a good job now will eliminate continued costs in the future.

SEISMIC INVESTIGATION - A study of existing structures, other than building, to determine their adequacy to resist earthquake forces is being made at the Puget Sound Naval Shipyard.

ECONOMICS OF EXCESS FACILITY DEMOLITION - A study of the economics of excess facility demolition is currently being conducted to explore the effects of demolition on reduction of annual O&MN expenditures to maintain structures in excess status - a principal area of study interest is the continuing energy cost associated with preservation of excess facilities. Upon study completion, significant study findings will be made available for general information and use.

INFORMATION PRESENTATION . . . ENVIRONMENTAL IMPACT ASSESSMENT/STATEMENT - A new slide presentation, The Environmental Impact Process, was given during the second annual NAVFAC 201/202 Conference at Annapolis, Maryland, on 22 October 1974. The presentation was developed to explain the legislative requirements and processing procedure for EIAs and EISs. Specific emphasis was given to EIAs required for newly-developed installation Master Plans.

The intention of the slide show was to stimulate discussion, especially among Engineering Field Divisions representatives responsible for Master Plans, to clarify possible areas of confusion. The slides and narrative script used during the Conference are available for loan from the Installations Planning Division, Code 202, NAVFACENGCOMHQ, Alexandria, Va., Autovon 221-7344.

NAVY FORESTRY PROGRAM IN THE BLACK - Proceeds from timber sales made at Department of the Navy activities during FY74 reached a new high of $1,907,682, resulting in an excess of $1,160,005 over expenses. Reforestation of areas which previously required mowing or brush control has reduced grounds maintenance costs by more than $60,000 per year. In addition, professional management of forest areas has improved wildlife habitat, protected soil and water resources, improved the environment and recreation potentials, and provided buffer zones and screening for industrial areas. The Deputy Assistant Commander for Real Estate, NAVFAC, is responsible for program direction through the Forestry Branch.

Naval Facilities Engineering Command
SITUATION REPORT

NCF MATERIEL SUPPORT - A concentrated effort was initiated in November to improve NCF materiel support. First, a two-day conference was hosted by CBC Port Hueneme during which CBC, CESO and NAVFAC representatives met with CBLANT and CBPAC representatives to define problems, set objectives and assign priorities. This was followed by a two-day meeting of CBC supply officers with NAVFAC, CESO and FACSO representatives to develop planned courses of action to meet the objectives. A third meeting was held at the Ships Parts Control Center (SPCC), Mechanicsburg, Penn., with representatives from CBPAC, CBLANT, CESO, NAVFAC, NAVSUP, SPCC and FMSO to develop detailed plans for expanding repair parts support to include NMCB camp equipment and non-USN numbered equipment. A follow-on meeting with CBPAC and CBLANT supply officers is planned for Fall 1975 at CBC Gulfport to review progress toward objectives and to initiate further action plans.

NAVFAC COMPUTERIZED SPEC SYSTEM IN OPERATION - Terminals have been installed at all CONUS EFDs and are now being used for spec preparation for selected projects. One hundred forty-five guide specs are now on the computer.

AMPHIBIOUS LOGISTIC AND SEALIFT SUPPORT FACILITIES DEVELOPMENTS - A compendium of current assets and techniques available for the discharge of containerships and bargeships in the absence of developed and intact port facilities, has just been published by NAVFAC at the direction of NAVMAT and CNO. The publication is a summary of studies and test data compiled by NAVFAC Code 03. Military and commercial equipment are included. It is intended that the publication serve as a tool in operational planning pending completion of developments and future acquisitions. Funding and development of the Navy's Container Offloading and Transfer System (COTS) in support of the DOD project masterplan for a container supported distribution system, commenced in FY75. The Navy project COTS will provide for sealift and amphibious logistic support by developing: deployable container discharge facilities, elevated pontoon causeway/piers, self-propelled causeways and sideloadable warping tugs as well as a variety of other supporting equipment techniques and trade off analyses for ultimate system acquisition. Incremental completion for early operational availability in support of multi-service and fleet tests is planned.

SYSTEMS COST GUIDE NEARS COMPLETION - A guide which indicates the unit cost of 15 building systems is nearly complete. The guide is intended for use in making design decisions and for cost control reviews. Its principal function is to provide cost guidance between the budget and final design stages.

COLLEGE PROGRAM

In 1971, the Chief of Civil Engineers, U.S. Navy, initiated the CEC College Program, a public affairs presentation designed to provide for the exchange of professional knowledge and to promote the profession of engineering; to emphasize the engineering and professional competence of the Civil Engineer Corps and to acquaint engineering students with the Corps and the career opportunities it offers.

The program has now reached acceleration with 138 presentations to students of leading colleges and universities during Fiscal Year 1974 and approximately 100 programs in the current fiscal calendar.

The topics are varied and include such subjects as: underwater construction materials and techniques, construction in Antarctica, engineering solutions to some of the Navy's environmental problems, radioisotope power generation and trash fired steam boilers. A typical presentation is from 35 to 45 minutes with the remainder of an hour for a question and answer period.

An informative and illustrated brochure concerning the presentations is available.

Persons interested in scheduling an appearance by a Civil Engineer Corps officers are invited to contact one of the regional College Program Officers listed below.

NAME & TELEPHONE	MAILING ADDRESS
CDR W. G. Shafer ..... (215) 755-4821 Govt. Autovon: 443-4821	Northern Division Naval Facilities Eng. Command Philadelphia, PA 19112
LT John Osth ..... (312) 688-2324 Govt. Autovon: 792-2324	Public Works Center Great Lakes, IL 60088 Attn: (Code 110)
LT Jeff Fesler ..... (803) 743-2275 Govt. Autovon: 922-2275	Southern Division Naval Facilities Eng. Command Public Works Center Building 1 Pensacola, FL 32508
LT Robert Taylor ..... (415) 871-2938 Govt. Autovon: 859-2938	Western Division Naval Facilities Eng. Command San Bruno, CA 94066
CDR Earl Seeber ..... (202) 433-2569 Govt. Autovon: 288-2569	Chesapeake Division Naval Facilities Eng. Command Washington Navy Yard Washington, DC 20390
LT Dennis Bussey ..... (804) 444-7531 Govt. Autovon: 690-7531	Assistant Resident Officer in Charge of Construction Atlantic Division Naval Facilities Eng. Command Sewell's Point Area Norfolk, VA 23511
LT S. F. Erickson ..... (805) 982-5655 Govt. Autovon: 360-5655	Commanding Officer Naval School Civil Engineer Corps Officers Port Hueneme, CA 93043
LCDR Dick Andrews ..... (401) 841-2543 Govt. Autovon: 948-2543	OICC/ROICC Naval Activities Naragansett Bay Area Newport, RI 02840

Young persons interested in a Navy career with the Civil Engineer Corps should contact their local Navy recruiter for details. If desired, the recruiter can arrange for a personal and informal 'rap' session with a Civil Engineers Corps officer through one of the officers listed.

No obligation, of course.

The Navy gears up for...

Underwater construction

• Washington, D.C.

In its expanding role in new technologies, the Naval Facilities Engineering Command (NAVFAC) has become the focal point within the Naval Material Command for the design, construction, maintenance and repair of all *sub-surface* fixed ocean facilities.

These installations include offshore platforms, sensor arrays, underwater cables and pipelines, mooring systems and their related shore terminal connections.

To accomplish the new mission, NAVFAC established the Ocean Facilities Engineering and Construction Project Office at its Chesapeake Division (CHESDIV) in 1971 to serve as the center of expertise for the NAVFAC Ocean Facilities Program.

Recognizing that efficient and effective execution of ocean facility construction projects would require a variety of specialized equipment not currently in the NAVFAC inventory, NAVFAC established and CHESNAVFAC-ENGCOM is executing a program of identifying, procuring and maintaining an inventory of specialized ocean facilities equipment.

The inventory will enhance the NAVFAC and Naval Construction Force's (NCF) rapid response capability for construction and repair of those ocean facilities which are elements of high priority Navy defense systems.

The stock items are being procured from commercial sources and from Navy laboratories and in many cases reflect recent development efforts.

Some specific types of equipment which are either currently in the inventory or have been defined for future procurement include: oceanographic cable winches; linear cable handling machines; powered cable reel stands; underwater cable test units; acoustic transponder navigation systems; satellite navigation systems; automatic boat positioning equipment; platform positioning winches; underwater TV recording systems; seafloor soil corers and samplers; underwater rock drills; and other items.

Current planning calls for new additional equipment to be added to the inventory each fiscal year through FY78 as the ocean facilities program increases in scope.

Ocean facilities equipment pools are currently located at the Construction Battalion Center, Port Hueneme, Calif.; the Navy Supply Center, Cheatham Annex, Williamsburg, Va.; and at the Washington Navy Yard, Washington, D.C. The Chesapeake Division allocates funds for storage costs and major equipment maintenance and retains administrative control for use by those elements of the NCF and government contractors who may be engaged in defense-related ocean construction projects. Navy laboratories will also use the equipment to reduce the cost of support to ocean related research and development. Users of the equipment will normally be expected to fund for shipping, training, operational maintenance and refurbishment after use.

Two new pieces of equipment have now been added to the Naval Facilities Engineering Command's ocean engineering and construction equipment inventory to aid the Underwater Construction Teams (UCTs) in fulfilling the Navy's challenging mission of underwater construction.

A diver propulsion vehicle (DPV) has been approved by the Naval Sea Systems Command for use by the UCTs in specialized construction. This vehicle, while commercially available, has been modified to meet the Navy's particular standards for operational safety and project support requirements.

The underwater constructor must be just as concerned with selection and surveying of the construction site as is the surface constructor. The DPVs are utilized in this effort to expedite scanning of the ocean floor. With a top speed of 3.0 knots, the DPV enables a diver who is limited by depth and time to search with a minimum expenditure of energy an area threefold that which he could normally swim. Preliminary inspections of existing cable systems and pipelines can be performed more efficiently using the DPVs.

The second new acquisition is a self-contained, underwater video recording system. The unit has a distinct advantage over ordinary underwater video systems that require an umbilical to the surface. However, in rare instances, when direct top-side supervision of an underwater construction task is necessary, the unit can be cabled to a surface monitor, providing real time information to the supervisor and increasing his ability to control the operation.

The video system contains a low-light level camera which can automatically focus from six inches to infinity and quite often "sees" things that the diver cannot. With the aid of a three-inch monitor built into the unit, the diver can see exactly what is being recorded on video tape; this as opposed to a still camera system where photographs are not available until they have undergone processing. The diver can also rewind and play back the tape underwater for viewing on his monitor so segments may be reshot for increased clarity.

Finished tapes can then guide the designer and display the underwater situations to non-divers and present to a project customer an accurate record of work performed. Video records of underwater work also serve as valuable training aids for the improvement of construction techniques, the disclosing of possible discrepancies in method or design, or in demonstrating to new construction divers how a task is performed.

Currently, the equipment inventory contains six DPVs and two underwater video systems. Each UCT has two DPVs and one video system under its control for use in performing underwater construction tasks. The other two DPVs and a video system (on order) are held by the inventory manager, Chesapeake Division, Naval Facilities Engineering Command, Ocean Engineering and Construction Project Office, Washington, D.C.

For further information concerning equipment types, availability and loan agreements, interested persons may contact CHESNAVFACENGCOM Code FPO-1, Washington Navy Yard, Washington, D.C. 20374. Phone (202) 433-3881 or Autovon 288-3881.

Diver Propulsion Vehicle
By LT G. SCOTT GUTHRIE, CEC, USN
Chesapeake Division, NAVFAC

Underwater Inventory
By WALT HILSABECK
Chesapeake Division, NAVFAC

Editor's Notes and Comments

• IT IS A RARITY for identifiable individuals to be portrayed on our cover. But since the cover boys of this edition are already eagerly identified by wives, mothers, children, messmates et al, it is only fair to disclose them to all readers. The cover, of course, illustrates the four duty categories a Civil Engineer Corps officer is normally assigned during his career which is the subject of the article "The Corps — a status report" authored by CDR James W. Weir on page 4 of this edition. The officers photographed were selected because they are instructors of the particular CEC specialty at CECOS and are prototypes of today's Civil Engineer Corps. Clockwise they are: LT Tim R. Brandenburg, *Seabees* (Oregon State University, BS/ME '69); LT Stephen F. Erickson, *Public Works* (BSCE, University of Toledo '67; MS, Ohio State University '69); LT Jerry L. Vernon, *Construction Contracts* (BS/Architectural Engr, University of Texas '67); and LCDR Michael D. Porter (U.S. Naval Academy '60; BSCE, Renesselaer Polytechnic Institute and MSCE, Georgia Institute of Technology).

• NEXT, AN IMPORTANT LETTER:

I have just recently received the fall, 1974 copy of the *Navy Civil Engineer*. In looking through it I was struck by an article on page 15 titled "Energy costs . . . a budget nightmare!" I was shocked by the unbelievable increases in energy costs from July 1973 to September 1974. Upon closer inspection I found why the increases were so astronomical — they were wrong.

Whoever prepared the figures in the table on page 15 merely divided the figures for September 1974 by the figures for July 1973 and (mistakenly) called the resulting quotients the percents of increase. The percents of increase are properly found by substracting the July 1973 figures from the September 1974 figures and dividing these resulting differences by their respective figures from July 1973. These quotients are then the true percents of increase.

The table on page 15 should appear as follows:

SHORE ENERGY COSTS			
	JUL 73	SEP 74	INCREASE
NAVY DISTILLATE (Bbl)	$5.54	$15.50	180%
HEATING OIL (Bbl)	$4.63	$16.14	249%
GASOLINE (Gal)	36c	56c	56%
COAL (Ton)	$21.00/TON	$47.00/TON	124%
ELECTRICITY (MWH)	$12.25/MWH	$24.00/MWH	96%
NATURAL GAS (MBTU)	58.1c/MBTU	101.5c/MBTU	75%

Aside from this one error I find your fall issue of *The Navy Civil Engineer* to be as accurate and interesting as ever, and, as a member of the Ready Reserve, I am particularly pleased and impressed by the commentary by RADM Marschall concerning the changes in the reserve program that are currently in progress.

/s/ Bruce P. Elsner
LT, CEC, USNR-R
Albuquerque, New Mexico

EDITOR'S NOTE: It is incredible that such an error occurred. It is more incredible that Reader Elsner was the *sole* individual to notify us. Incidentally, because of the lieutenant's location perhaps he could recommend within the enchanting vastness of New Mexico a sanctuary for editorial (and mathematical) meditation. — HW

• WE NOW WRITE FINIS to the great-missing-magazine-mystery as experienced by the library of our beloved alma mater, CECOS — thanks to the successful sleuthing of our readers. To clue the uninformed: a commercial firm engaged in binding periodicals suffered a disastrous fire, with CECOS, among others, losing valuable reference editions that are not as easily replaced as may be surmised. Librarian *Barbara Horn* issued a call (Help!) through these pages and quite apparently our readers comprise a worldwide network of dedicated operatives, as these good folk captured and surrendered to Mrs. Horn replacement copies that now complete the professional reference publications. Good folk not previously acknowledged include: *P. M. Dillon,* Pacific Division, NAVFAC; *W. Lilacs,* Southfield, Mich.;*LT Valentine,* RNMCB 2 (Det 11-9), Salt Lake City; *LCDR J. B. Rodgers,* CEC, USNR-R, Encinitas, Calif.;*W. Henry Ence,* Western Division, NAVFAC, San Bruno, Calif.; *R. R. Schaaf,* HQNAVFAC, Alexandria, Va.;*John B. Rogers,* Arevlo & Safino, San Diego, Calif.; and *LCDR G. W. Callender, Jr.,* on behalf of the Officer-in-Charge of Construction, Marianas. With such success it's tempting for Librarian Horn to now request copies of the Gutenberg Bible, or perhaps better, the author's original manuscripts for same.

Now, it's Rear Admiral Heid . . .

PHILADELPHIA — The nomination of Captain Charles C. Heid, CEC, USN, for promotion to the grade of Rear Admiral in the Civil Engineer Corps of the U.S. Navy has been approved by the President and sent to the Senate for confirmation.

Captain Heid is Commanding Officer of the 24-state Northern Division of the Naval Facilities Engineering Command (NAVFAC), with headquarters at the Philadelphia Naval Base.

Prior to assuming that duty in December 1973, he served for three years as Vice Commander of NAVFAC's Pacific Division and Deputy Commander of Naval Construction Battalions (Seebees), U.S. Pacific Fleet.

A native of El Paso, Texas, Captain Heid is a 1947 graduate of the U.S. Naval Academy.

Rear Admiral C. C. Heid

A "capital" bit of urban planning, or:

By L. P. EARLE
Chesapeake Division
NAVFAC

•Washington

In July of 1971, the Department of Defense became the first executive department to plan comprehensively for its facilities in the Washington area. The *Plan for Department of Defense Facilities in the National Capital Region,* known as the DOD/NCR plan, was revealed in the Spring, 1972, issue of *Navy Civil Engineer.* The plan guides the consolidation of 88 scattered defense facilities into 22 long range locations augmented by new construction.

This past summer, Chesapeake Division, acting for the Secretary of Defense, resubmitted to the National Capital Planning Commission "The Military Family Housing Study." This appendix to the DOD/NCR plan had drawn considerable criticism from the civilian community when it was first sent to the Commission for review and approval in an earlier version in mid 1973. That earlier version of the Housing Study was unexpectedly withdrawn from the Commission agenda in September, 1973, due to a change in OSD family housing adequacy criteria which had invalidated much of its data.

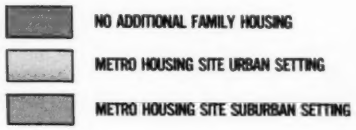
The challenge which the adverse community reaction offered to the CHESDIV planners was to revise it in such a way as to bridge a developing controversy between the military and the surrounding civilian community over the best means of housing service personnel in the Washington area.

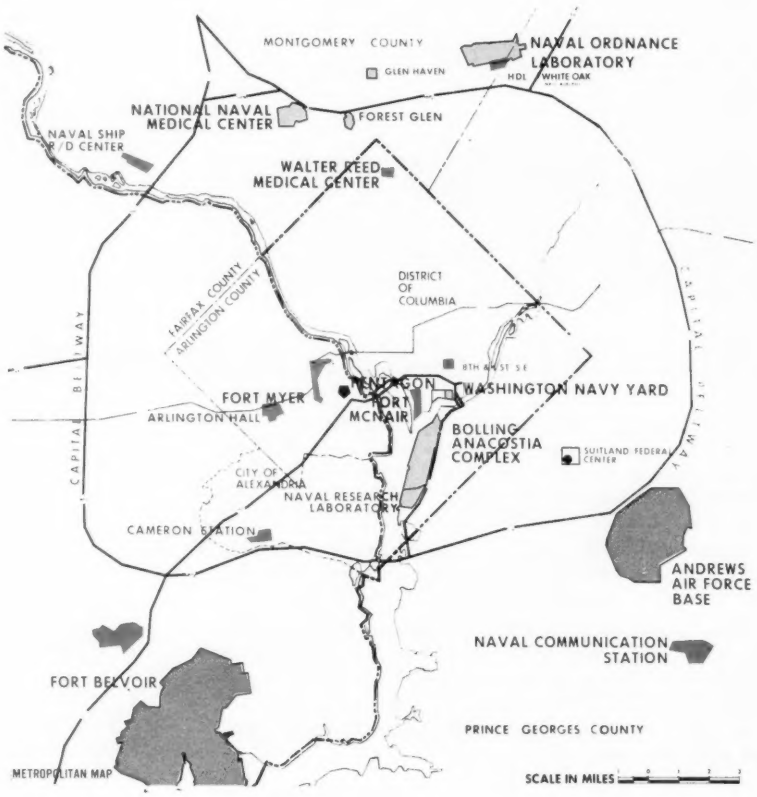
The rough going which the DOD Housing Study has had, compared to the DOD/NCR plan, is a result both of recent trends in city planning ideology and the greater degree of political significance attached to siting housing versus offices. While rapid growth was viewed by local governments in the sixties as an almost unalloyed benefit to the community, new growth in the seventies has more often been subjected to the planner's yardstick of cost/benefit analysis.

New houses must be expensive enough and attract households with incomes high enough to pay taxes which meet the cost of the additional service load on the local government. By this standard, military quarters occupying non-taxable Federal land were clearly a drain on the local jurisdiction's treasuries. Despite the fact that federal aid to impacted school districts and independent provision of many services on military installations lesssened the imbalance of revenue generated to cost incurred, few area governments were thrilled at the prospect of servicing several thousand new units of non-taxable public quarters.

Opposition grows

Leading opposition to the original study was the Prince George's County Council, elected officials of the jurisdiction which had the most severe problem of rapid growth at a socio-economic level progressively lowering the environmental and public service standards of the county. The original study proposed to build some 7,100 units of military family housing in the metropolitan area over the next fifteen years, of which 3,170 — or 44% —





Military housing in the D.C. area

would be in Prince George, sited at Andrews Air Force Base, which has bad sewage disposal problems; and Cheltenham Communication Station which is designated a natural conservation zone on all county plans. Prince George County, its "no growth" policy the strongest in the region, began to mobilize its congressional delegation in opposition to the DOD Housing Study.

Additional opposition to the study came from the Washington Metropolitan Council of Governments (COG). The COG Board of Directors voted a resolution in September, 1973, expressing dissatisfaction with the study and urged the Defense Department to provide more data on its housing needs and to expand the scope of the study to include alternative means to quarters construction of satisfying these needs. COG staffers felt unable to approve a large construction program of military housing without jurisdiction-by-jurisdiction projections of long range military presence. These were, of course, unavailable.

Alternatives which COG was asking the military to consider included expansion of the leasing program; joint military/civilian rehabilitation of community housing; a special housing allowance for high cost metropolitan areas; and greater participation in HUD housing programs. In making these requests COG's goals extended beyond the narrow purview of protecting its constiuent government's fiscal health to encompass more abstract and intellectualized aims.

A dislike of the social segregation of the military from the civilian community seemed apparent as well as a practical desire to pump DOD resources into urban problem areas where HUD money was not forthcoming. DOD planers, for their part, wondered how utilization of the community's moderate income housing units by military personnel could be preferable to creation of new moderate income units in a metropolitan area suffering from an overall shortage of such housing.

Issues resolved

In the year following the original housing study, CHESDIV planners had been coming to terms with the problems encountered by the study. While attempting to be flexible to many of the valid community concerns expressed during the A95 review process, the planners had been impressed by the basic fact that the military construction program, with its availability of funding and of site resources, seemed preferable to a reliance on either defunct civilian housing programs or the inflation and sewer moratorium-ridden private market.

The implication of the overall reduction in justified new units of on-base housing and the uncertainty of future major additions to the quarters stock was a decision to endorse the current program and to explore more flexible alternatives.

The linchpin of the political controversy over the Military Family Housing Study was resolved by negotiation. After representations made to the staff of the Deputy Assistant Secretary of Defense for Installations and Housing by congressmen and elected officials

DEVELOPMENT STRATEGY FOR ON BASE CONSTRUCTION	
MAXIMUM IMMEDIATE DEVELOPMENT	
B/A	1055 UNITS
ANDREWS	1350 UNITS
FT. BELVOIR	1039 UNITS
GLEN HAVEN	300 UNITS
	3744 UNITS
POTENTIAL DEVELOPMENT WITHIN 5-10 YEARS	
NOL	150 UNITS
NNMC	160 UNITS*
FOREST GLEN	60 UNITS
FT. BELVOIR	500 UNITS
	870 UNITS

of Prince George County, a compromise solution was reached whereby housing development at the Naval Communication Station, Washington, (Cheltenham) was dropped and additional units at Andrews were limited to 1,350 in return for a guaranteed tie-in to the Washington Suburban Sanitary Commission sewer system at Andrews.

The Military Family Housing Study has now been revised to include both the new housing programming numbers generated and some new directions desired by the Washington planning community. Since the revision, FY74 programmed units have been added to the backlogged FY72 and 73 funded units creating a situation in which 3,744 units, or the majority of all planned units for the fifteen year period, are immediately available for construction.

The long range plan for siting family housing within the National Capital Region and development strategy for on base construction is shown in the accompanying may and table.

The study ends

The final hurdle for Chesapeake Division planners was the presentation of the study to the National Capital Planning Commission at its monthly hearing and obtaining concurrence so individual activities and installations could proceed with their site planning, environmental impact statements, and construction. The study was largely allowed to speak for itself, but special emphasis was placed on the very strong need for housing in the National Capital Region in view of exceptionally low housing starts in the first half of 1974.

It was pointed out to the Commission that, as a result of inflation, approximately 25 units of family housing were lost each month. This loss of housing impacted the community as a whole, not just military families, as competition for all types of quarters: detached, townhouse, and multi-family, was acute.

One major community concern expressed at the Planning Commission received a particularly strong response. The CHESDIV spokesman countered the suggestion that the Department of Defense was creating a military enclave with its construction of military housing by pointing out that 91 percent of military families in the Washington area live off base and full development of the 3,774 new public quarters would only reduce this proportion to 83 percent. It was this portrayal of Defense housing policy as only responding with construction to a community market unable to meet the needs of military personnel rather than desiring the construction of on base housing per se that encouraged the National Capital Planning Commission to endorse the findings of the study.

For the long range, the desired switchover from quarters construction to alternative programs designed to stimulate the serviceman's utilization of community housing could be impeded by continued stagnation of the private housing market. Nonetheless, in the era of the all volunteer armed forces and rising pay for service personnel, a continuing role for public quarters is less and less certain.

SPEAKING FROM TOPSIDE

'. . . challenging, interesting,

It is a distinct pleasure for me to share a few thoughts with the readers of The Navy Civil Engineer. I very much appreciate the opportunity provided by the Chief in deciding to share this column with other flag officers of the Civil Engineer Corps.

The flag/general officer billet in the Office of the Secretary of Defense is one which is less familiar than our other flag billets to members of the Civil Engineer Corps family.

Admiral Jack Dillon was the first naval officer to serve as Director of Construction Operations in the office of the Deputy Assistant Secretary of Defense (Installations and Housing), following a succession of general officers from the Army Corps of Engineers.

Mr. Perry J. Fliakas is the deputy assistant secretary, having been recently appointed to this position following the retirement of Mr. Ed Sheridan, who had served as DASD (I&H) for many years and who was well known throughout the CEC. As one of the four directors under Mr. Fliakas, my particular responsibilities include construction operations and facilities management.

The facilities management responsibilities were assumed in November 1974 as a result of a reorganization related primarily to the general reduction in staffing which is affecting OSD as well as the military departments.

The other directorates in DASD (I&H) include facilities programming, headed by Mr. Evan Harrington, who is responsible for programming all military construction, including family housing; installation management and planning, under Mr. E. A. "Bud" Rogner, who is responsibile for base requirements and utilization, real property matters, and the natural resources programs; and construction standards and design, under Mr. Sig Gerber, who is responsible for basic design criteria, A&E selection, area cost factors, and the projections of construction inflation used in programming.

One of our principal concerns over the past year, and one which will continue well into 1975, has been inflation in construction costs. Beginning in December 1973 with the oil crisis and the growing problems with material availability, the rate of inflation rose sharply, reaching *perhaps twelve percent per year, or twice that which had been anticipated.*

As a result it has been a difficult year indeed for the construction agents. Based on bids received from 1 January 1974 through 30 September, full scope current working estimates averaged 116 percent of programmed amounts for all three military departments. The result, of course, has been reductions in scope to make award, bid rejection, and either redesign/rebid or cancellation.

We report annually to the Congress those projects awarded at greater than 25 percent increase in authorization and those projects which were reduced in scope in order to make an award within authorization. In the FY74 report, *24 percent* of the total projects awarded during the year fell into one of these two categories.

The difficulty we have experienced in executing the FY74 program will inevitably reflect upon the effectiveness and the morale of the operating forces as some of these badly needed facilities are delayed and deferred. We are beginning, however, to see some improvement. Material availability has certainly improved and prices are beginning to ease as construction volume begins to fall off nationwide. We have also noted an increase in competition recently on some of the larger jobs. We are hopeful that these trends indicate an improved outlook for executing the FY75 program.

Our principal function in construction involves establishing policy and procedures for construction and for contracting of architect/engineer (A/E) services. We have a number of interesting actions in process to change the Armed Services Procurement Reg-

Next issue the Commander of the Naval Facilities Engineering Command, Rear Admiral A. R. Marschall, CEC, USN invites comments in this column from Rear Admiral A. W. Walton, Jr., CEC, USN, Commanding Officer of the Atlantic Division.

and rewarding . . .'

ulations to simplify or streamline procedures, reduce "red tape," and make DOD contracting more attractive to prospective bidders and proposers.

In the A/E field, we are working on increasing the authority of field activities to approve A/E selections from the present *$100,000 to $200,000,* which should reduce delays in awarding some of the larger A/E contracts. We are also working with the construction agents to explore possible means of combatting inflation through prompt progress payment, elimination of retained percentages on larger jobs, payment for materials stored off-site, substitution of materials, and realistic completion times.

I am very conscious of the dedicated efforts being applied by those of you on the "firing line" to resolve problems, get the necessary decisions made, and award projects as quickly as possible. Be assured that your efforts are known and appreciated throughout the civilian hierarchy in the office of the Secretary of Defense.

Another interesting facet of our responsibilities is management of the Japanese Facilities Adjustment Programs, a $500 million construction program under which the Japanese Government will design and construct facilities necessary to effect consolidations of US installations agreed upon by our two governments. We also are responsible for the remainder of the Southeast Asia construction programs and serve as consultant to the Assistant Secretary of Defense (International Security Affairs) on other construction matters in support of the Military Assistance Program or in responding to requests for assistance in construction matters from foreign governments.

The facilities management responsibility includes surveillance of the DOD Real Property Maintenance Activity (RPMA) Program, which accounts for annual expenditures of $3.25 billion, approximately four percent of the DOD budget. We provide resource management through review, analysis, and evaluation of budget and apportionment actions to insure that funds and manpower are applied to priority needs.

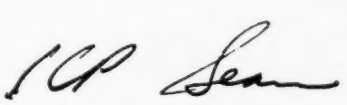
To provide more efficient, effective, and economical operation of the total DOD plant, we have a program underway to consolidate RPMA functions in those areas where major DOD installations are in close proximity. Joint service efforts to consolidate RPMA functions through the use of single RPMA managers and interservice support agreements are proving fruitful, having already resulted in cost savings exceeding $30 million.

Further, there are substantial additional economies and management improvements that can be realized through this program, and these and other management innovations will enable us to reduce the RPMA demand on the defense dollar, in the face of the continuing spiral in costs.

I find it rewarding working at OSD. Almost all of the problems reaching this level for resolution are challenging and interesting. We have many opportunities to meet with our counterparts in other federal agencies and with representatives of the construction industry and the architect-engineer community. They share many of our concerns, and it has been a real education to hear their views, coming as they do from a somewhat different perspective.

My office is primarily military, with officers from Army, Navy and Air Force, and is the only predominantly military office under the Assistant Secretary of Defense (Installations and Logistics).

As such, I feel we have a valuable role to play in bringing our practical field experience to bear on the problems and policy matters under decision at OSD. I suppose the best test of any duty is whether or not one would recommend it to others — with no reservations or qualifications, I can recommend duty at OSD if you have the opportunity. I am certain you would find it challenging, interesting, and rewarding.



By RADM KENNETH P. SEARS, CEC, USN
Director of Construction Operations
Office of the Deputy Assistant Secretary of Defense
Installations and Housing

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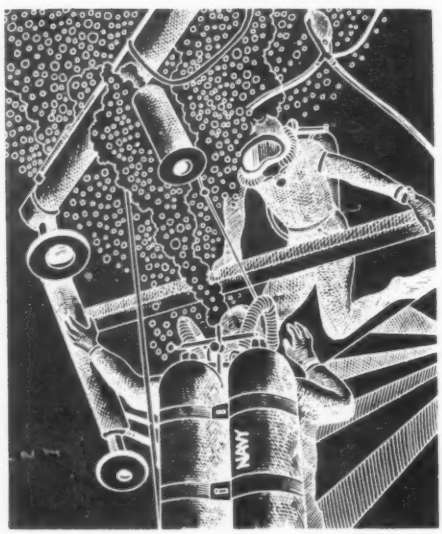

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